COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, Editor

Volume 22 NEW YORK, THURSDAY, JULY 27, 1922. Number 4

The Vital Aspect of Price

SECRETARY HOOVER'S plans to distribute current coal production and to hold the price within reason are as timely and will be as well received as the conferences on prices in May that resulted in holding quotations in check from June 1 until last week.

Necessity for some control over distribution has been increasingly evident since the first week of July, and as always when acute distribution problems arise price troubles begin. Mr. Hoover has again stepped in at a critical juncture. With truly remarkable foresight he anticipated the details of the approaching crisis and when the time to act arrived he was ready with a fully developed, workable plan. He has co-ordinated the Interstate Commerce Commission, the departments of Justice, Interior and Commerce, the railroads and the coal operators. He has so laid his plans that the usual protesting voices in the Senate are quiet. His plans will produce results, for he is of the type that will shape the details to the practical objections as they arise.

As to the urgency of directing the restricted flow of coal in the direction of transportation, public utilities and certain other essential users there can be no question. On the equally, if not—to the operators—more important question of prices some would hold back approval. The two cannot be separated in any practical working program. Price has been directing distribution, as for instance last week when the more than doubling in price of western Kentucky coal in Chicago acted as a magnet for large consignments of Pennsylvania high-volatile coal, the offering of which on that unusual market served to check the upward rise in quotations. When the government takes over, in effect, the current production of coal it must have a great deal to say as to the price that will be charged for that coal.

There is a larger and more vital aspect of this price question. Price is the evidence to the public of how the industry is functioning. The public is interested in wages of coal miners only as these wages are interpreted into prices of coal. The public has stood on the side lines while this strike has been in progress, quite apathetic at first, then patiently tolerant, now aroused. It has put up with the inconvenience of the strike (and will if necessary put up with more than inconvenience) because it has appreciated that the operators are trying to liquidate wages of union coal-mine labor and that the basis of the policy of the United Mine Workers is opposition to wage reductions. But what is the public saying about an industry that stages a strike to lower the wages of its workers and at the same time extorts huge prices for coal? There is no fairness in that.

An indication of how the people feel on this question is found in the action this week of the Governor of Colorado, who, when advised that certain operators in that state had increased prices one-third, warned them that he would withdraw the support of the National Guard at once unless prices were restored to their former level. He said that he had put troops at the mines in the interest of the consuming public that needs the coal and to provide work for willing miners, and not to protect anyone's pocketbook.

Price is the sore spot. The race for coal may be largely responsible for the flight of prices last week, but if the coal operators are not able—and they are not—to save themselves from this source of condemnation, the government is more than warranted in stepping in. Whether some producers like it or not they must be protected from themselves, and those producing the greater part of the current tonnage who have and will continue voluntarily to maintain a fair price are entitled to protection from those who will not.

Unreasonable wages and unreasonable prices are in the same category. The country wants neither and the government is looked to for protection from both. Mr. Hoover has said that no operator intent on robbing the public can get a car in which to load coal. And he has taken the responsibility of saying what price is reasonable. He is right. And with his usual decisiveness he has not temporized with the situation. The administration might consider the same line of policy with respect to union coal-mine wages when planning a resumption of mine operations.

A Sympathetic Strike In the Hard-Coal Region

WHAT the anthracite operators have always feared has come to pass. The union is using the suspension in the anthracite region as a club to hold over the bituminous operators. Unless the demands of the union for the old-time four-state conference in the bituminous region are granted the strike in the anthracite region will be allowed to continue indefinitely.

There is a part of the public that is not in industry and that sympathizes but little with the woes of the manufacturer (who uses soft coal) but has, nevertheless, a keen interest in the filling with anthracite of its own domestic coal bin. The union is desirous of so sorely distressing all the people of the United States, soft-coal and hard-coal users alike, that they will be driven to give the miners just what they ask—an interstate conference in which union and non-union regions will be conjoined and a check-off that will make the operators in every part of the country pay dues to the union.

When the union talks high prices it trots out the hard-coal field, because hard coal is expensive to mine, to pump and to prepare and has a wider and stronger appeal; when it talks strike it calmly forgets the anthracite mines and introduces the bituminous region, where it wants a renewal of the old conditions—the con-

tract with the Central Competitive region or something even more in restraint of trade. It asks no change in the districting of the anthracite region. There it already makes a 100-per cent collective bargain embracing all three districts, but it is nevertheless as ill-disposed to bargain there as it is elsewhere. Loudly as it calls for the collective bargain, it would have none just at present in the anthracite region, where what might be termed a sympathetic strike is going on.

The anthracite operators have asked for arbitration. The miners reject it because, forsooth, they cannot get a reinstatement of the Central Competitive agreement in an entirely different and relatively non-competitive region. They give no reason for their rejection of Mr. Harding's proposition as to the arbitration of the anthracite difficulty, and Mr. Harding apparently lumps the anthracite and bituminous fields together in his thinking and makes no effort to direct public opinion to the vast difference in the two or to the game John L. Lewis is playing.

The anthracite region has become a vassal to the bituminous districts. The operators in it are permitted to make no treaty with their own men till the union wins or loses in the soft-coal field.

An Acceptable Settlement

POINTEDLY and forcefully the New York *Tribune* asks why Washington does not drive the miners and operators, either or both, into the open and make them face the square issue of what sort of settlement is acceptable. The miners are assailed because they ask "not arbitration but prejudgment." The operators' offer of arbitration by districts instead of on a national basis is characterized as absurd. "The coal industry is a national one. Every operator competes to some extent against every other. There must be a national wage base if there is to be industrial peace," says the *Tribune*.

This is all true as far as it goes, but it should go farther. What is a national wage base? Does anyone conceive for a moment that a national wage base means that a miner who undercuts the coal, shoots it down and loads it into cars, whether he work in a 9-ft. bed or in 3-ft. coal, whether he gets 300 days or but 150 days' work per year as a regular thing, whether in one mine he must lay room track, push cars and dig ditches and another not, must have the same compensation per ton of coal regardless of conditions? Does anyone maintain that the day laborer at a mine in a community where living costs are low should receive the same wage per day as one working where living costs are relatively high? Of course not. That would be absurd. The miners' union would be the last to agree to such a scheme, for the necessity and opportunity of fighting for more favorable differentials has given the union life and many an official a job.

What the *Tribune* is thinking about is indicated by the wording. "Suppose the arbitral board in one district decided wages should come down and in the adjacent district that wages should go up!" it says, adding "Divergent decisions would make district arbitrations no arbitration at all. As matters stand they are for arbitration in words but against it in fact.".

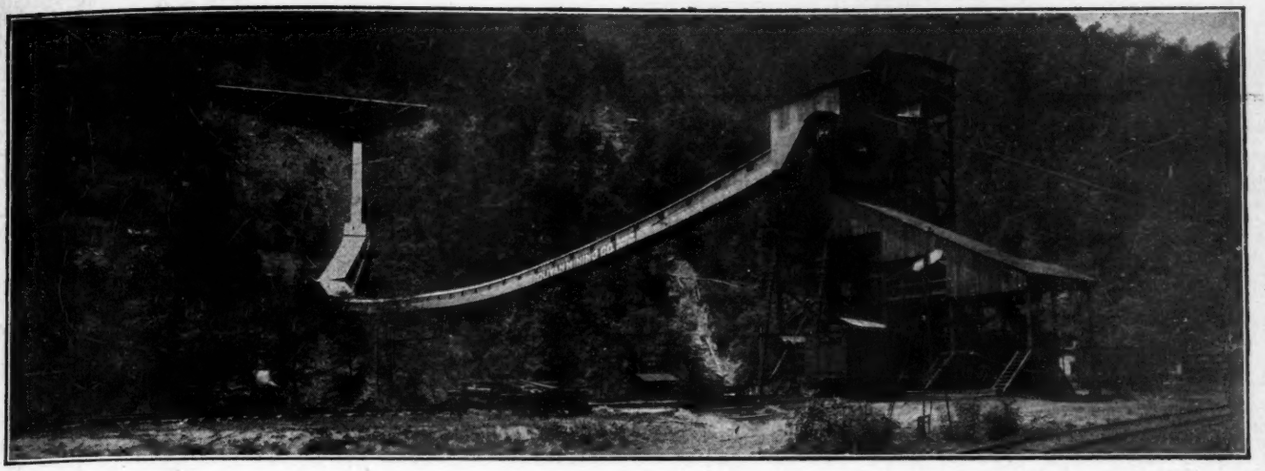
What the *Tribune* really is arguing for is a national wage policy for the bituminous-coal industry—that is to say, such unified control by the operators on the one side as is exercised by the miners through the United Mine Workers on the other. Such in fact was the practical effect of the old Central Competitive Field conferences and agreements. The interstate contracts broadly set a general rate of increase—they were never successful in producing a decrease—a percentage to be applied to existing rates. The contracting parties were obligated to return to their respective districts and write the terms of the general conference into district contracts, but in no case could any provisions be added to the agreements that would increase the cost of production or decrease the earning power of the mine workers. In other words, no opportunity was offered—in fact it was expressly denied—that differentials between fields be changed. Marginal organized fields awaited the outcome of the negotiations in the Central Competitive Field before setting their wage scales. Their decisions were largely but not entirely influenced by the larger decision to which the operators were not a party though the miners were, through their international officers.

The outstanding advantages of a method of determining broad changes in wage levels such as resulted from the old interstate conference are self-evident. This process tends to work even-handed justice and to stabilize the coal industry. But a national conference is no place to solve local problems. So long ago as March 8, 1916, Mr. Moorshead, a scale committeemen from Illinois, introduced a resolution into the joint conference pointing out that "serious inequalities between the four districts" had been disclosed in years of negotiations, and that these had caused "serious conflicts, because of the many inequalities and injustices that have been forced on miners and operators alike," and asking that a commission be appointed to inquire into the setting up of new machinery for redetermining differentials.

A large part of the record before the President's Bituminous Coal Commission in 1920 is occupied with discussion of differentials. Both sides sought changes. The commission pleaded lack of time for consideration and instead suggested a new commission of miners and operators to take up the problem. Nothing has ever been done about either of these recommendations. Why? Because the operators East and West are wide apart in their desires and necessities and the miners see no advantage in raising the question, especially as it usually has the check-off problem pinned to it.

Sitting with Illinois and Indiana and the miners, Pittsburgh and Ohio, having but two votes in eight, have no chance in the Central Competitive conference to adjust their differentials to meet the more potent competition of West Virginia. Central Pennsylvania follows the lead of Pittsburgh as the Southwest does that of Illinois. A regrouping of districts with the State of Pennsylvania and Ohio in one; Illinois, Indiana, and western Kentucky in another, and the Southwest, Iowa and Texas a third, would give modern expression to the group idea, wherein differentials could find their proper solution and the miners lose nothing in strength and power as compared with the older and—from the standpoint of competitive conditions—obsolete Central Competitive Field. The largest of these groups would set the pace for the others, until very soon a way of getting together nationally would be found.

Why do the United Workers refuse to consider any group save the old one? Because John L. Lewis set that as his policy in this strike, and he dare not deviate a hair's breadth from the letter of his first dictum, else Frank Farrington find excuse to break away for a separate settlement in Illinois.



Belt Conveyor Supported by Suspension Bridge Used To Bring Coal Across River in Logan Field

Coal Is Dropped from Drop-Bottom Cars Into 500-Ton Bin, from Which It Is Fed to Retarding Conveyor—Coal Is Picked Clean and Fed to Belt Conveyor, Which Carries It to Tipple

By A. D. Carr*
Cincinnati, Ohio

TWO seams of coal are operated by the Guyan Mining Co., a subsidiary of the Jewett, Bigelow & Brooks Coal Co., of Cincinnati, Ohio, at Wilbur, Logan County, W. Va.—the Eagle seam, a gas coal which lies approximately 100 ft. above the level of the Guyandot River at that point, and the No. 2, or Island Creek, seam, which is about 200 ft. higher in the hills. Both coal beds cover a large area.

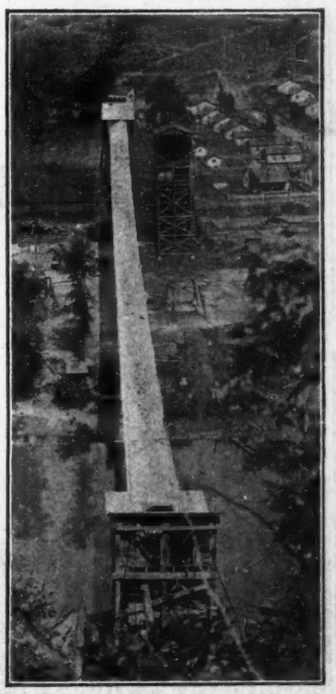
As will be seen on the left in the frontispiece, a 500-ton storage bin has been erected on the side hill, and coal is discharged into this by the drop-bottom cars from the workings in the Island Creek seam. This bin is 200 ft. long and 20 ft. wide and over it passes a double mine-car track. Thus two trips of cars can be dumped at the same time. There are two slots in the top of this bin. These are made about 60 ft. long and consequently the cars can be and are dumped without stopping. Thus they are promptly returned to the mines. The readiness with which they are discharged makes possible a large output with but few cars.

A feeder shown at the foot of the conveyor pulls coal out of the bin and discharges it onto a retarding flight conveyor, the shed of which can be seen on the side of the hill. This conveyor is 365 ft. long and has a pitch of 35 deg. It carries the coal down to another bin that has a capacity of 100 tons, where coal from the Eagle seam is dumped from the mine cars.

The coal is removed from this bin by a 36-in. x 15-ft. plate feeder and is discharged onto a single revolving disk screen that removes the slack or fine coal, which falls directly onto a 30-in. belt conveyor, 504 ft. long. This conveyor passes under the full length of a 54-in. x 15-ft. picking table. Here the coal is well cleaned, the freedom from slack making inspection easy.

The coal discharged from the surface of the picking table falls on the same 30-in. belt. Thus the coarse coal is delivered on the top of the fine, and in this manner the belt is protected against cutting. The conveyor line and shed are supported by two 2¼-in. lock-coil cables which have a combined capacity of 200 tons safe load.

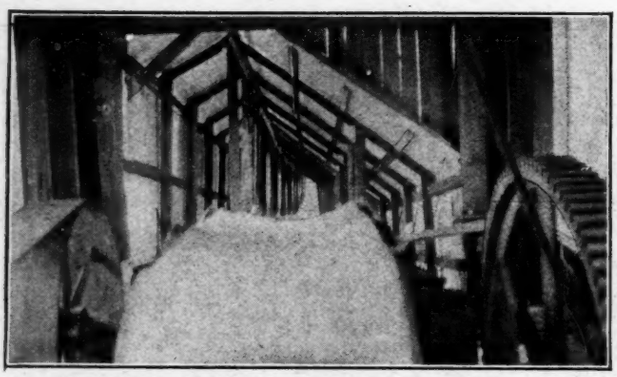
The belt operates on gradual-troughing ball-bearing carriers. It has a capacity of 250 tons per hour when running at the present speed, which is 250 ft. per minute. This can be increased to about 350 ft. per minute, thereby increasing the hourly capacity of the belt from 250 to 350 tons per hour. It is operated by a 30-hp. motor which is wired so that it can be controlled from either end of the conveyor. The structure that supports the belt is suspended from the cables by means of ⅝-in. steel rods at intervals of 5 ft. To these rods is fastened a 4 x 6-in. crosspiece on which the conveyor or gallery is built. This, of course, is made of light material and is bolted together. It has



SUSPENSION BRIDGE ACROSS GUYANDOT

As seen from the side of the river on which the mines are opened and looking toward the railroad.

*Chief engineer, Jewett, Bigelow & Brooks Coal Co.



BELT CONVEYOR AND SUSPENDED SHED COVERING IT

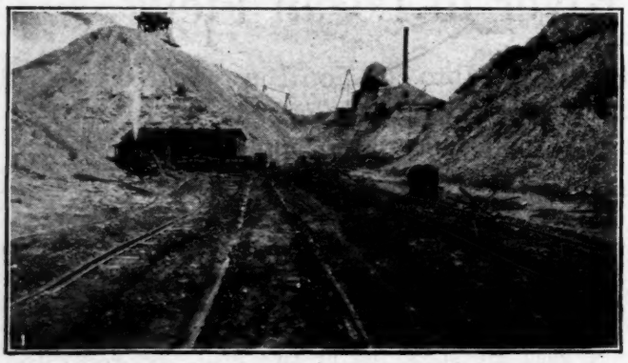
The shed slopes in the main toward the direction in which the heaviest winds come. The belt is 504 ft. long and 30 in. wide. Its capacity can be raised to 2,800 tons per eight-hour day if needed. At present it is delivering about half that quantity.

a walkway on the up-river side which is used in crossing the river and in inspecting and oiling the machinery. The roof of this gallery slopes toward the down-river side, the purpose being to lessen the wind pressure, all the heaviest wind storms coming from down the river. The gallery is covered with corrugated iron of No. 20 gage. There are windows at intervals of about 20 ft. in this gallery. At this point the river is 300 ft. wide, and the conveyor is 75 ft. in the clear above the stream. Reinforced-concrete blocks each containing 60 cu.yd. of concrete and weighing 100 tons serve as anchorages.

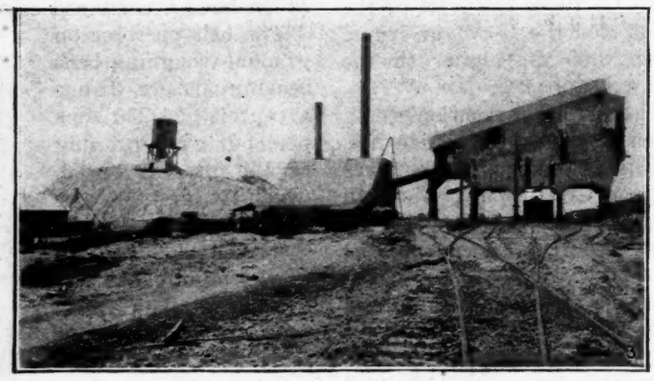
The discharge tower is 87 ft. high. At this point the coal falls into a chute down which it slides into a 75-ton receiving bin. This tower also serves as a support for the cables.

From this bin the coal is drawn by lift gates and loaded into cars. At present a bar screen is being used which separates the steam coal from the lump, the two being led to different tracks. The plant now produces 1,500 tons per eight-hour day, but the purpose of the company is to raise the output to 2,000 tons soon.

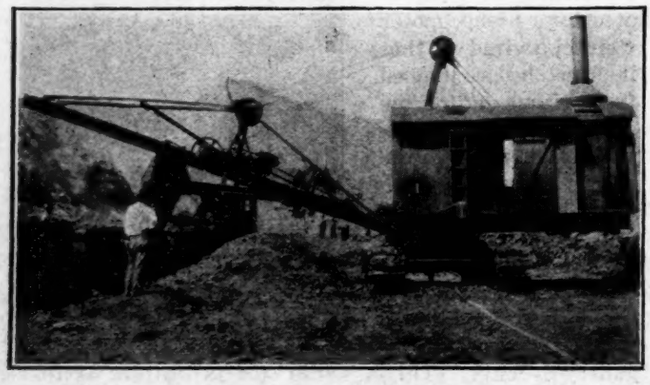
The erection of the suspension bridge saved the owners of the mine the high cost of a steel bridge, and the success in operating the flexible structure is believed fully to justify the substitution.



Scenes *in* Minden Strippings *of* Missouri



Where the coal mined by open-cut methods is probably as thin as can be found being thus worked in any other strip-pit region



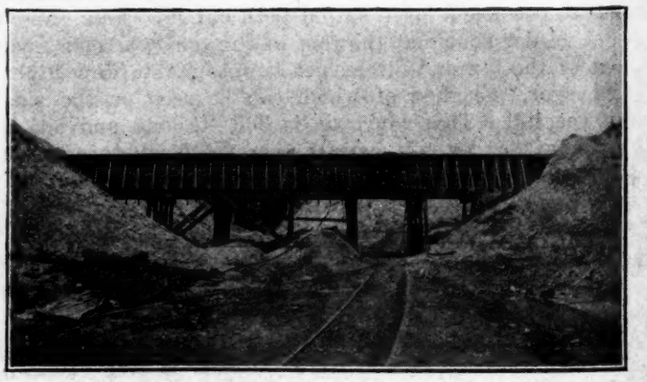
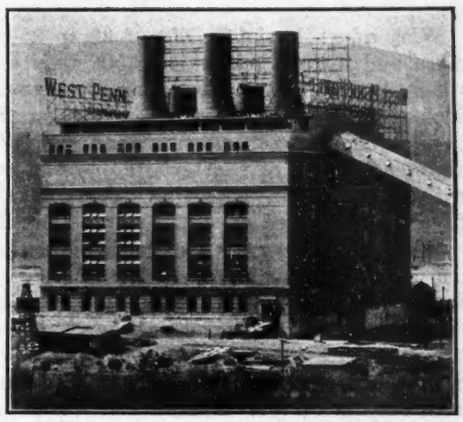


Fig. 1 shows the center cut that has to be kept open as long as the pit is extended. Where to store the spoil along the sides of this center cut is a difficult problem to solve. Fig. 2 is a picture of the type of 6-cu.yd. stripping shovel most generally used. Fig. 3 is a view of the tipple, power house and tanks at the same mine as is depicted in Fig. 1. Fig. 4 exhibits a steam coal loader and Fig. 5 is a flume built to carry a stream across a strip-pit track as the simplest way to avoid flooding.

Considerations Which Should Govern When Deciding Whether to Generate or Buy Power*

By W. C. Adams†
Chicago, Ill.



Groups of Mines Should Be Able to Generate Electricity for 1.8c. per Kilowatt-Hour Power-Plant Expense—At Some Mines Home-Generated Power Costs 25c. per Ton

IT IS impossible to make a general classification of mines which should or should not purchase power because so many variables enter into the problem. Mine power requirements depend upon the tonnage produced, the depth of the shaft, the underground conditions, the system of working and the equipment installed. The power consumption per ton of coal mined varies with the number of days during which the mine is operated, but it must not be forgotten that the fan, pumps and some of the hoisting and general work require power irrespective of the coal output.

Fully electrified mines using electric hoists, a motor-driven fan, tipple equipment and miscellaneous mechanical appliances, pumps, locomotives, gathering motors, mining machines, etc., will have a power requirement under average mining conditions when working 180 to 200 days per year of from 2.75 to 3.5-kw.-hr. per ton. The effect of additional idle days will be to increase the power consumption per ton, which during extremely slack periods may reach 150 to 160 per cent of the normal rate.

All mines, however, are not provided with mechanical equipment for performing every one of the operations noted. Such plants may use steam surface equipment, gather coal with mules or dig coal with hand picks. The power requirements obviously would depend upon the number of operations for which power is furnished and may vary from 2 to 5 hp.-hr. per ton for average mining time, with increases for additional idle days.

Mines in Midwest Have 25c. Power Charges

Most of the mines in the Middle Western coal fields that operate on power generated at the mine have extremely inefficient plants. The power costs for fully equipped mines with such generating stations is as high as 25c. per ton when fixed charges are taken into account.

Mines that have similar power requirements and use central-station current under similar conditions have a total cost of 7 to 14c. per ton of output. This includes all items chargeable to power, such as investment in, and operation of, auxiliary equipment made necessary by the installation of purchased energy. This estimate is based on Illinois power rates.

With this possible saving of from 6 to 11c. per ton in view it is evident that if the coal operation is to use power generated at the mine, the plant to produce it should be designed with a view to economy.

Some of the larger operators have rehabilitated their plants, and the resulting operations are provided with power equipment suitable for economical operation. These plants will furnish power at a cost comparable with purchased energy and ranging from 6 to 12c. per ton, depending largely on the tonnage produced. When such plants are suitably situated and arranged to furnish power for two or more large mine operations, the cost per ton can be brought well below that paid for purchased power.

Power Costs as Low as Two Cents a Ton

Generating stations at operations having a capacity of approximately 5,000 tons per day, when economically designed and with a mine operating time of 200 days per year, should produce power at a total cost chargeable to mining of from 2 to 2½c. per kilowatt-hour when coal is charged at $2.25 per ton. Stations serving two or more such operations would have a lower cost and with mines having an aggregate capacity of 3,000,000 tons per year the total power-plant expense should be approximately 1.8c. per kilowatt-hour, including all plant charges. To this figure should be added investment costs and charges for lines, substations and such auxiliary equipment as are made necessary at those mines which are remote from the station and receive energy over a transmission line.

Some operations have been laid out with a view to using not only purchased electric energy but also steam power generated at the plant, the purpose being to avoid the investment necessary for an equalizing hoisting unit. This arrangement does not take advantage of the lower power increment of either system and cannot be recommended for general installation except in cases where the life of the operation is short. The power costs at such an installation will always be higher than could be obtained by generating all the power at an economical power plant at the mine or by purchasing all the current necessary from a central station.

*Paper, entitled "The Use of Purchased Power for Coal-Mine Operations," read before the joint session of the Western Society of Engineers with the Chicago branches of the American Institute of Electrical Engineers and the American Institute of Mining and Metallurgical Engineers, at Chicago, May 22, 1922.

†Vice-president of Allen & Garcia Co., Chicago.

With mines having a life of 20 to 25 years or even more and a daily output of 3,500 tons or better, it is generally justifiable to expend capital enough to provide such a generating station as will lower the power cost to that charged for electric energy by Illinois central stations. Mines of shorter life or lower outputs almost without exception will show operating economies in favor of purchased power.

The source of power chosen should not affect the output of a coal-mining operation provided the available sources of supply are equally reliable. Coal production costs, however, do depend on the source of energy, but the difference is not directly proportional to the costs of power delivered from the several sources, because with certain of these special equipment is made necessary and the fixed charges on this investment modify the costs that must be borne and, furthermore, direct and indirect costs inevitably result from the interruptions which arise when certain sources of supply are used.

Alternating current should be used for distributing energy from the delivery point to the converter substations at load centers, except where the operations are small and are expected to have a short life. Whether the power is furnished by a central station of a public-utility company or by a generating station at the mine site and operated by the mining company does not alter the design of the system by which the power should be distributed, except in the case, possibly, of small existing operations having direct-current generating stations. In such installations some advantage might be gained in the distribution system by an arrangement of underground converter substations made possible by the purchase of power. In a discussion of the proper source of electrical energy, however, only mines having reasonably efficient distribution systems should be considered, as it is impossible to classify or give general estimates of power consumption or costs for operations that waste a large part of the delivered current.

Power Costs Not the Sole Consideration

Whether the power required for a coal-mining operation should be generated at the mine or purchased from a central station of a public-utility company can be decided only after a study of each individual problem, if the decision is to be based solely on a comparison of operating economies. There are, however, certain other facts and conclusions in connection with such an analysis that should be taken into consideration. Their proper evaluation may render a decision possible without making a comparison of the power costs.

It is not always good policy to place a coal-mining operation in a position where the operator cannot control the power supply. Especially is this true if a doubt exists as to the reliability of the public-utility power available, for it is not logical to consider making the output of any industrial enterprise dependent upon a power supply that is liable to frequent interruptions of uncertain duration.

Opinions as to what degree of continuity of service should be expected from public-utility plants may vary. We know, however, that it is possible to design and build power plants for mining operations in which interruptions are rare, and it would seem that an operator has a right to expect the same service from the public-utility company. There are, of course, certain interruptions which lightning, heavy storms and the like are apt to cause and which no commercial type of construction can prevent. With interruptions of this character included, however, such shutdowns should not occur on an average more than once a month.

Furthermore, the power supply must have uniform characteristics. Voltages, frequencies or steam pressures that vary are not conducive to satisfactory and economical operation of equipment and must not be permitted if the best results are to be realized.

If real service were demanded by all operators who use central-station power, or contemplate its purchase, it doubtless would be supplied, for though coal-mine loads may not be the most attractive from the central-station viewpoint, yet for the utility company operating in most coal fields such a load aids in obtaining the operating characteristics favorable to economy.

Such a demand by the power users would force the utility company to restrict its connected load to the capacity of its plant and system instead of seeking to secure all the load possible in the hope, and with the promise, that at some time, more or less remote, both would be developed to meet all requirements.

The operations at the plant are regulated by a schedule, expressed or implied, and any delays or interruptions of even short duration cause confusion and affect the morale of the men. The return of power often causes secondary interruptions which are due to the heavy combined load arising when pieces of equipment are started simultaneously. Such interruptions aggravate a situation already bad and slow up operations. The resultant loss of tonnage always equals the production of a period many times as long as the duration of the actual shutdown.

Miners Leave Mine When Power Goes Off

Where an interruption is unduly extended the miners as a rule leave their places and quit for the day. This dereliction of duty may not appear reasonable but it is one of the conditions with which a coal operator has to contend. All interruptions therefore reduce the coal output but do not remove the necessity of paying wages, operating and fixed charges during such shutdown periods. This results in an unproductive expense that increases the cost of coal getting. Interruptions not only reduce the margin of actual profit but deprive the operator of the profit he would have made had he produced a full run of coal. This applies to mining operations with greater force than to any other industry except, perhaps, those where a shutdown means ruin of product.

There are many instances where mines have failed because the car supply has not been reliable. An uncertain power source can produce the same result. Power sources that cannot be relied upon result in an undependable mine production. This handicaps the operator in obtaining contracts for time delivery, or if such contracts are carried the quantity of "free coal" is cut down, and upon this the mine owner often depends for his profit.

Mining operations, to be assured of power supply from a central station, should be provided with a loop system of transmission whereby power can be furnished from two or more sources. Some line trouble must be expected with any transmission system, but failure of supply from two sources because of such difficulty should be exceptional.

When central-station energy is used at a mine it is advisable to insure the steadiness of the supply of power for the fan and hoist by installing auxiliaries

which can be put in operation when the purchased power fails. This is especially true in gaseous and deep mines, for under such conditions it is not advisable to allow the ventilation to cease, even temporarily, and means must be provided for bringing men out of the mine.

Where the record of service given by the central station in the particular field in which the operation is located has not been satisfactory and where it appears that a station and transmission capacity will not be maintained ample enough to insure a continuous power supply in times of stress the purchase of power is not justified and not advisable, provided, of course, it is possible to install a generating plant at the mine.

Hauling Water Negatives Power Economy

Where an adequate water supply for plant operation cannot be obtained it is impractical to provide an isolated generating station. It is just as unreasonable to equip a mine with a generating plant that must depend during dry months on water being hauled to it as it is to put one's trust in a public-utility company which cannot be relied on to furnish a continuous and satisfactory supply of power.

The financial condition of the operating company may not permit or justify the installation of such a generating station as will afford desirable economies. The investment necessary for such a station would increase the capital expenditure for a modern, well-equipped mine from 20 to 45 per cent, depending on the capacity of the mine. If this capital is not available and if, in order to have power generated at the mine, it is necessary to erect or continue to operate with a plant such as is found at many mines—horizontal-return tubular low-pressure boilers, non-condensing engines and similar equipment—the only excuse for not purchasing power would be its unreliability.

Hoisting equipment may be affected by the power source, as it must conform to the requirements of the public-utility company which furnishes current. In some cases these companies have a ruling that regulates the maximum size of induction-motor hoists, and this imposes a heavy investment burden on mines of small or medium capacity which require from 200 to 500 hp. Equalizing equipments between these sizes entails a cost which may run from three to four times that of the induction motor and its control.

Mixed operations using steam hoists in addition to purchased power for the purpose of avoiding this additional investment have proved highly unsatisfactory both in operation and resultant power cost. In considering the energy supply for existing mines having a remaining life of from 20 to 25 years the choice should be based on the results of an analysis of the problem presented. This choice lies between the rehabilitation of the existing power plant to meet the total requirements of the mine and the purchase of power from a central station. If decision is made in favor of a generating plant at the mine the retention of the steam hoist and the employment of mixed-pressure turbines with regenerators probably would entail the least investment. With purchased power the hoist should be electrified. The only justifiable deviation from this course would be in the case of mines having the prospect of only a short life.

A comparison of the operating cost as calculated for the two systems, other factors being equal, should determine whether a mine should use purchased power or energy furnished by a generating station at the mine site.

Knowledge of general underground conditions and the details of mine operation usually will give sufficient data to determine the power requirements with a reasonable degree of accuracy. This forms the basis for calculation of the power costs based on central-station current or on a generating station of any particular design.

Installations at the mine using purchased power usually are simple. They consist of a transformer substation and the connection to the distributing buses. The purchase of power makes necessary some auxiliary equipment that would not be required or embodied in the plant design if power were generated at the mine. In any comparative power-cost statement the investment, fixed, operating and maintenance charges in connection with such equipment should be included as a charge against central-station power.

Included under this item would be the general heating plant, auxiliary man hoist and fan drives, as well as such other equipment as would be ordinarily embodied in the power plant but requred as separate installations if current is purchased.

Charges for interest and depreciation on the investment and for fixed and maintenance expense should be included as a charge against central-station power to offset similar charges included in generating-station costs.

The cost chargeable to purchased power should include: (1) Cost of power delivery, calculated on the basis of established rates of the central station; (2) interest on investment required for lines, substation and other equipment necessary to power delivery; (3) maintenance and fixed charges on lines, substation and other requirements up to the point of delivery; (4) operating labor chargeable to purchased power up to the point of delivery; (5) interest on investment for auxiliary equipment made necessary by the purchase of power; (6) maintenance and fixed charges on auxiliary equipment made necessary by the purchase of power; (7) labor chargeable to auxiliary equipment made necessary by purchasing power; (8) interest on investment for hoisting equipment; (9) maintenance and fixed charges on hoisting equipment; (10) interest and fixed charges on abandoned equipment.

Sometimes Raises Load Factor 300 per Cent

Public-utility power plants serving numerous mines, delivering energy to industrial enterprises and supplying current for lighting throughout the territory over which their systems extend have a varied load, resulting in an annual load factor seldom less than 40 per cent. The annual load factor of a single mine varies between 11 and 25 per cent. This can be increased by combining two or more mines so that both may be served by one power plant. This is advisable where a group of mines is operated under one management.

Larger capacity and its better load factor give the central station an operating advantage which offsets any superiority that the generating plant at the mine may enjoy as a result of the elimination of the freight and handling charges on coal.

A generating station at the mine cannot make power at a cost comparable with a central station unless special attention is paid to so design and operate such a plant as to obtain economies in operation such as are usually attained at central stations. The power plant

should be designed to give such economies as are justified by the character of the load, but in general the investment should not exceed 40c. per ton of annual capacity.

Consideration should be given the possibility of burning such low-grade fuels or sizes of coal as can be sold only with difficulty in the commercial field. Capacity of units should be so selected as to give economical operation under low and idle-day load requirements, as such periods normally constitute not less than 63 per cent of the total operating time. The hoist should preferably be electric, although there are cases, especially in the rehabilitation of a power plant for an existing operation, where a steam hoist with regenerator and mixed-pressure turbines is justified.

In calculating the operating cost of a generating station at the mine it is necessary to understand fully the operating conditions imposed. The low yearly load factor increases the cost of power generation materially. This being the case it is necessary to give this factor careful consideration if the expense of actual operation is to meet the calculated cost.

Coal operators differ much as to the proper method of charging fuel to their power plants. It would seem that the only proper charge is the prevailing market price of the class of coal used. The cost chargeable to power generation should include:

(1) Power-plant cost. This embraces under (a) operation: Coal, (charged to the plant at the prevailing market price), water (including cost of treatment and labor), engine-room labor, boiler-room labor, coal- and ash-handling labor, ash removal, electrical labor, miscellaneous engine- and boiler-room supplies; (b) maintenance costs: charges for engine room, boiler room, coal- and ash-handling apparatus, electrical apparatus; (c) fixed charges, which covers investment cost, amortization cost, administration cost, insurance and taxes.

(2) Interest and fixed charges on disused equipment.

(3) Interest on investment for hoisting equipment.

(4) Maintenance and fixed charges on hoisting equipment.

As has been pointed out frequently, the production of coal and the generation of power are two distinct enterprises. Coal-mining officials generally are men having coal-mine experience and little knowledge of the economic generation of power. It is essential, therefore, that a separate department with proper talent be instituted if power is to be generated economically. This adds to the burden of the management. There is a tendency, moreover, among most coal operators to defer appropriations for plant improvement in favor of those for mine operation. This makes it difficult to maintain a low power-production cost.

In general, from an economic standpoint, if the cost of purchased power exceeds the calculated generated-power cost by 10 per cent it would still be advisable to purchase power. In other words, it is believed that the value to the operator of eliminating the necessity of building and operating a generating station at the mine can be capitalized at 10 per cent of the calculated power cost.

Dust Off the Leather Medals; Here's a Winner

IN THE old days out on the baked plains they used to attempt "rain making." Somehow it didn't work so well. Elsewhere at various times humanity booners have striven to create perpetual motion. Results: Ditto, if not more so. But why be discouraged? "In perseverance there is purse," or something like that. So now comes F. F. Affelder, assistant to the president of the Hillman Coal & Coke Co., with a double-back-action case-hardened grown-on-grandpap's-farm-in-Virginia form of contract to be used in the purchase of electric power for coal mines. It is guaranteed to be squabble-proof. With it in effect, violence cannot arise concerning quantities of power delivered, rates, meter accuracies or anything else.

Mr. Affelder has had lots of fun with it at dry engineering meetings here and there. It won eight full octaves of guffaw on May 22 in Chicago at a joint meeting of the Western Society of Engineers with the Chicago branches of the A. I. E. E. and the American Institute of Mining and Metallurgical Engineers. It is called "Schedule D.F." (three guesses at the initials). And this is it, respectfully submitted:

SCHEDULE D-F

Proposed Schedule for the Sale of Electric Power

The producer hereby agrees to furnish power to the consumer under the following terms and conditions:

1. Notwithstanding anything contained herein to the contrary, the consumer shall pay to the producer such a rate per kilowatt hour as shall in the opinion of the producer be sufficient to satisfy the producer. This amount shall be known as the producer's demand.

2. The consumer's demand shall constitute any and all futile requests on the part of the consumer whereby he shall request better service or lower rates.

3. The consumer shall pay to the producer the full amount of the producer's demands and in addition thereto shall pay for the power consumed at the rate of 8c. per kilowatt hour when the crooked line on the meter chart forms a convex curve, 6c. per kilowatt hour when the line forms a concave curve, and 4c. per kilowatt hour when the line is so badly blurred that neither the producer nor the consumer is in a position to bet real money on the shape of the line, it being specifically understood and agreed that under no circumstances shall the consumer question the accuracy of the producer's meter or other apparatus.

4. The diversity factor shall be anything that shall divert the attention of the consumer from making complaints to the producer. If, for instance, the consumer's chief electrical engineer shall allow his diversion to take the form of playing golf and his average score on the four Saturday afternoons in any one month shall be less than par for the course on which he plays, a reduction of 1 per cent shall be made in the producer's bill for power in that month for each stroke that the aforesaid average shall be under par.

5. In recognition of the fact that the consumer could produce his own power more economically with good coal than with a poorer grade, the producer agrees that a test shall be made four times a year of the heat value of the consumer's coal. If such tests shall show that the consumer's coal is of higher heat value than that which the producer uses at his power plant, the producer may, if he feels so inclined, make such a rebate to the consumer per 100 B.t.u. as to convince the consumer that it is more economical to buy power than to make it.

6. Recognizing the fact that the rates per kilowatt hour, as stated in the third paragraph, are entirely too high, the producer agrees to rebate 5 of the first $100, $25 of the next $100, $50 of the next $200 and as much of the remaining amount of the bill as is necessary to make the net cost to the consumer equal to an amount of between 1½c. and 2c. per kilowatt hour, the producer agreeing that he will get all he can without giving the customer any real cause to figure on generating his own power.

Study of Stresses and Design Of Head Sheaves For Coal-Mine Shafts

By J. S. Watts
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Excessive Weight, Especially in the Rim of Head Sheaves, Causes Slip in Rope—Effect of Lead—Cooling Action of Spokes in Casting Rim—Design of Bosses—Fit of Hub

SHEAVES used on the headframes of mine shafts to support the hoisting rope ordinarily are made with a cast-iron rim and hub, and wrought-iron or steel spokes cast into place. This type of construction is practically universal. It affords a neat and economical pulley and has proved very successful with the low speeds and light loads formerly used. Unfortunately the stresses imposed on the various parts are not well understood and have not received the consideration that they require.

This has resulted in pulleys being used for speeds and loads that soon wear out both themselves and the rope. In the past small pulleys, intended for light loads and low speeds, could be designed with more or less success by rule of thumb, but now that the ropes used are becoming much larger, and consequently require pulleys of greater diameter, it is necessary to reduce the rotating weight of the pulley to the lowest safe limit consistent with the strength required, in order to decrease the inertia.

Even when a pulley of the type described is made as light as is consistent with safety the high velocities and rapid acceleration and retardation now demanded sometimes render it impossible to prevent the rope from slipping a little on the pulley at the beginning and end of each trip. The hoist is brought to rest so quickly that the inertia in the rim of the pulley is sufficient to keep it revolving after the rope has come to a stop. Unless this inertia can be reduced, by cutting down the weight in the pulley rim, this slipping cannot be prevented.

The evil effect of this slippage is obvious. It wears the rope always at the same point or at any rate so long as the rope is not moved on the drum of the hoist. The wear on the pulley rim is continuous and rapid, as it occurs four times during each round trip—that is, during both the two acceleration and braking periods.

Some engineers have attempted by fitting wood, leather or other soft material into the groove of the pulley to prevent this wear on the rope. This expedient doubtless reduces this wear, partly by reason of the increased friction between the rope and the pulley and partly because the softer material takes all the abrasion. Nevertheless, it has been found that this packing wears out so rapidly that it must be replaced frequently, making a sheave thus packed costly to maintain. Only in the event that the weight of the pulley cannot be reduced sufficiently to eliminate this slippage should this expedient be adopted.

By careful calculation it can be determined whether the rope will slip on the sheave. To avoid this slipping the energy in foot pounds stored in the rim of the pulley when revolving at the maximum velocity must be less than the force required to overcome the friction between the rope and pulley, in pounds, multiplied by the distance travelled by the rope, in feet, during the braking or acceleration periods. The energy in the pulley rim in foot-pounds will be $Wv^2/64.32$ where W = the weight of the rim in pounds, and v = the maximum peripheral velocity of the rim in feet per second, this latter being practically equal to the speed of the rope.

Sheave Travels Slower or Faster than Rope

During the acceleration period the rope must supply this energy to the rim through the friction between the two and it must be returned from the rim to the rope by the same medium. This friction will equal Lf pounds. Where L = the load on the rope at the pulley during the period under consideration, f = the coefficient of friction between the rope and the pulley. The distance through which this force acts equals the length of rope wound or unwound during the acceleration or braking period under consideration. This expressed in feet we will term S.

To prevent slipping, therefore, $Wv^2/64.32$ must not exceed LfS, or the maximum weight that the pulley rim should have, if slippage is to be avoided, is $W = 64.32\ LfS/v^2$.

The coefficient of friction, f, may be taken as 0.1, the rope usually being greasy and the groove in the pulley smooth. Care must be taken in using the above formula

to select figures applicable to the worst condition or that usually existing when the cage is being lowered empty.

If the weight of the rim as designed by this calculation proves to be much too heavy, it may be reduced most readily by decreasing the diameter. This reduction, however, increases the wear on the rope, which suffers severely when bent around too small a pulley. The velocity, v, is not altered by reducing the diameter as it must perforce be the same as that of the rope.

Finding Diameter That Will Reduce Wear

The point to be decided, then, is with what diameter will the sum of the wear due to slipping and that due to bending be a minimum. In general the diameter should be as large as it can be made without danger of slipping. Consequently the rim should be as light as the load will permit because when such is the case the allowable weight may be used to increase the diameter of the sheave as much as possible. The wear and tear on the rope that slipping causes will be much more destructive than that resulting from bending. The total wear will be at a minimum when the pulley is as large as it can be made, still keeping the weight below the point at which slippage would commence.

The procedure, therefore, to be followed in designing a new pulley should be to determine the maximum weight from the above formula and to calculate the section of the rim. Then, ascertaining the weight of this section per foot, we can arrive at the maximum diameter desirable.

If it proves impossible, under the speeds and loads specified, to obtain a pulley of reasonable diameter without inevitable slipping of the rope, an effort should be made to lengthen the periods of acceleration and retardation, because as the allowable weight of rim increases so does the length of these periods.

Generally speaking, this slipping of pulleys has been given little consideration by those responsible for their design, although its effect upon the rope and upon the sheave is extremely destructive and therefore deserves to be classed as the main consideration.

Sheave-rim sections are generally "designed" by rule of thumb or in proportion to some other dimension previously selected. I purpose to show later that they are almost always made much too heavy, and it is important to recognize that this excess weight merely shortens the life of the pulley.

Rim Should Be Designed to Meet Conditions

The shape of the rim as usually constructed is as shown in Fig. 1 and is evidently not susceptible of much improvement. The dimensions are dependent upon so many variables that it is impossible to give any empirical rules by which they may be calculated, meanwhile keeping the weight to the minimum. It is common practice to use the same pattern under any and all circumstances. This is, however, obviously a mistake, considering the higher speeds now in vogue.

Where the speed is so low that no slippage occurs, the weight of the rim is not of great importance, but under modern conditions it is essential that this weight be reduced as much as is safe. Each pulley, therefore, should be designed to suit the actual conditions under which it is expected to work. As the rims are swept in the foundry, no pattern is necessary and consequently the expense of casting a rim of new design is little more than that involved in using an old one.

The considerations which determine the section of the rim are as follows: The bottom of the groove should be machined to a radius slightly greater than that of the rope section. To avoid undue wear on the rope, even when it does not slip, the grooves should be smoothly machined from the bottom to a point about half way up the sides. Another good reason for machining this groove is that the rough casting always will warp and run somewhat out of true sideways. If this is not corrected by machining it may cause rope sway and result in the cage vibrating and rubbing hard on the guides.

The depth of the groove as well as its width at the top and the slope of the sides must be such as entirely to remove all danger that the rope will leave the groove, as such an eventuality, of course, would be disastrous. The width of the groove at the top and the slope of its sides must be such as to provide for the maximum lead angle of the rope. This is a function of the width of the hoisting-engine drum and of the distance from its center to that of the pulley.

This also usually determines the depth of the groove, but in cases where the cage is landed, and all stress taken off the rope, the groove must be deep enough to prevent the rope when slack from getting out of place. When the hoisting engine is well removed from the pulley, an additional allowance must be made for a possible swaying of the rope in windy weather.

Side of Rim a Casting Problem in the Main

The determination of the thickness of the metal in the sides of the rim is not based on strength but on the thinness with which it can be cast satisfactorily. The bead on the edge is for the purpose of insuring that there will be a rim in every part of the circle. If this bead were omitted and the flange of the rim run out to a comparatively thin edge, the metal would be quite likely to fail to fill the mold all around. In consequence the inequalities in the casting thus resulting would catch the rope and soon destroy it. The bead also stiffens the rim and reduces its liability to damage when being machined and erected. The size of this bead usually is left to the discretion of the foundryman, who decides how light he can make it and yet be sure of a good casting.

To determine the thickness of the rim at the bottom of the groove we must calculate the stresses imposed upon it and, if necessary, add metal at this point over that essential for the making of a good casting. The additional weight may be added with less injury at this point because most of the wear that takes place will occur here and also because weight at this point will have less energy when revolving than that located further from the center of the sheave.

At the same time the practice of making this thickness much greater than is required, in order to allow for wear, is wrong, as it defeats its own purpose by adding to the inertia of the pulley. Furthermore, it commonly causes sponginess in the casting, due to the thickness at this point being so much greater than that elsewhere. This sponginess does not usually become evident until the groove is slightly worn. Whenever it appears on the surface, however, the wear on the rope becomes so rapid that the pulley must soon be condemned.

The rim is subjected to the following stresses: A tensile stress due to centrifugal force, a compressive stress resulting from the load on the rope and tending to crush the rim, and a bending stress caused by the rope tending to take a straight line from the top of one

spoke to the top of the next. The centrifugal force is $C = \frac{Wv^2}{32.16\,R}$ where R = the radius of the rim in feet. The stress due to this force will be $C_f = C/A$ where A = area of rim in square inches.

The compressive stress due to the load on the rope will be $L_f = L/A$.

The tensile and compressive stresses due to the bending moment can be calculated from the formula for a beam uniformly loaded and supported at each end. This is:

$$W = 8B_fZ/l \text{ or } B_f = \frac{wl}{8Z}$$

Where B_f = the stress due to bending moment Z = the modulus of the section of the rim and W = the load imposed by the rope, which is determined from the triangle of force, as indicated in Fig. 2, where, as will be seen, the rope tends to take a straight line from one spoke to the next, but is prevented from doing so by the curvature of the rim. The downward thrust on the rim, w, is equal to the pull on the rope, L, multiplied by b/a. (See Fig. 2.)

Centrifugal stress opposes the compressive stress when the pulley is running, but not when it is standing. The two compressive stresses B_f and L_f must be considered together. The two tensile stresses B_f and C_f also should be so treated, and whichever pair is the greater in proportion to its safe working stress will be the one that will govern the design.

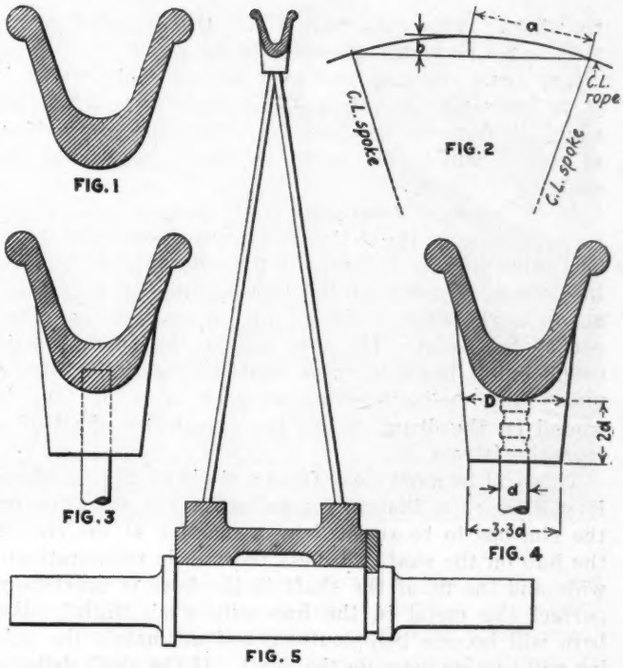
The stresses B_f and L_f vary from maximum to zero during each revolution, and are therefore live loads. C_f is a stress gradually applied and gradually removed. The safe working stress for a cast-iron rim, under these conditions, may be taken at 4,000 lb. per square inch in compression, and 1,000 lb. in tension. The spokes should be calculated to carry their respective loads as columns fixed at both ends. This calculation needs no further comment here.

If Spoke Enters Rim Bubbles Are Formed

The connection between spokes and rim is often made as shown in Fig. 3, and is ill-advised, as the molten iron will almost always, when it comes into contact with the cold spoke, bubble and boil, and on solidifying, that portion around the end of the spoke will be full of blowholes. These do not show in the finished casting, but a little wear in the groove soon brings them to the surface. The effect of such flaws, in wearing out the rope, is disastrous, and will compel the scrapping of the pulley after only a short period of usefulness. Blowholes are caused by moisture from the molding sand, being deposited on the spokes. This turns to steam when the molten iron strikes it.

Polishing and tinning the spokes will reduce this deposition of moisture, but it is practically impossible to escape having blowholes at these points, and therefore the spoke should not project into the rim, but stop at its lower edge, as shown in Fig. 4. Even if there were no danger that blowholes would be formed at these points, the iron will be chilled at the end of the spoke, and when the groove is worn down to the hard spot thus formed undue wear on the rope will result. The shape of the spoke end is not of much importance, as it carries little load in tension. Probably the neatest way of insuring a mechanical hold is to swage grooves around the ends of the spokes as shown in Fig. 4.

The function of the boss cast around the spoke is



CROSS-SECTIONS OF SHEAVES AND THEIR RIMS

Fig. 1 shows a usual form of cross-section of a pulley rim; Fig. 2 the relation between the downward thrust on the rim and the pull of the rope, the latter being equal to b/a times that pull. Fig. 3 shows a form of connection of spoke and rim which causes blowholes, and Fig. 4 one that is much to be preferred. The grooves swaged around the spoke give a strong hold. Fig. 5 shows a hub and two adjacent spokes. The hub is held in place by a collar and a split collar bolted to the hub which fits into an annular groove in the shaft.

to hold the end firmly, the spoke being considered as a column, fixed at each end. The boss must be rigid in order to do this. The actual stress that will come upon the boss is indeterminate, but as the total weight of the bosses can be only a small percentage of the weight of the pulley, an excess of metal at this point will do little harm. To make certain that the spoke will be held as a column, fixed at the ends, the end connection must be made sufficiently rigid to prevent any movement between spoke and rim at this point. This condition will be met if the connection is made such that its strength will be equal to the tensile strength of the spoke.

Boss Must Embed Spoke for Ample Distance

First, the bearing surface of the spoke in the boss must be made ample. Taking the crushing strength as twice the shearing, this condition will be fulfilled if the bearing area of the spoke in the boss is equal to one-half of the sectional area of the spoke—that is, the spoke must enter the casting for a distance equal to 0.5 of its diameter. In use this length would be insufficient to resist vibration, and it would be wise to make the connection strong enough to develop the full strength of the spoke in tension. Tests that I have made show that if the spoke projects into the casting for a distance equal to twice its diameter the grip of the casting on the spoke will be greater than the strength of the spoke in tension, even without any grooving of the end.

The diameter of the boss should be such as to give it the same strength in tension as the spoke. Taking the safe stress in tension for cast iron as 1,000 lb. and for steel as 10,000 lb. the area of cross-section of the boss must be ten times the area of the cross-section of

the spoke. This will require that the diameter of the boss be 3.3 times the diameter of the spoke.

The boss, for constructional reasons, into which it is not necessary to enter, should taper from 3.3 to 3.6 times the diameter of the spoke. The same dimensions, of course, will be necessary for the connection of the spoke to the hub.

Head sheaves frequently fail because the pulley becomes loose on the shaft and travels sideways along it. The cause of this difficulty is the side pull of the rope imposed as a result of the rope leading off the pulley at an angle when it is coiling on one or the other end of the drum. The side pull on the pulley rim is small, but it has a leverage equal to the radius of the pulley and, being reversed as each layer of rope is wound on the drum, it has the cumulative effect of a reversing stress.

This will be more clear from a study of Fig. 5, where it will be seen that any resultant force sideways on the rim has to be resisted by a reaction at the end of the hub on the shaft. Unless the hub is comparatively wide and the fit of the shaft in the bore is practically perfect the metal in the hub will crush slightly, the bore will become bell-mouthed, and ultimately the pulley will become loose on the shaft. If the shaft deflects under the load even if only a few thousandths of an inch, this crushing of the hub will be accentuated. Shaft diameters, therefore, should be carefully calculated to carry the load as a beam, with a stress not exceeding 6,600 lb. per square inch. As this stress on the shaft reverses during each revolution from a maximum compressive to a maximum tensile quantity any stress greater than that above mentioned will cause too great a deflection and ruin the fit of the shaft in the pulley.

For these reasons the hub of the pulley should be as long as possible and great pains should be taken to make certain that the bore of the hole be parallel out to the very ends. The tendency in machining a hole of this kind is to bell-mouth it slightly, and unless the bore is a good fit at each end of the hub at the start the pulley will soon become loose.

An effective method of preventing a movement of the sheave along the shaft which may happen even with a fair fit is to leave a collar turned on the shaft at one side of the pulley hub and to provide a split collar bolted to the hub and fitting into a groove in the shaft at the other side. On the other hand if the pulley is split a solid collar may be left on the shaft at both ends of the hub. The first of these methods is shown in Fig. 5, and the second does not need any further explanation.

Disk Coal Cutters Installed at Windber Mines

By A. S. Brosky*
Pittsburgh, Pa.

At Eureka No. 35 mine of the Berwind-White Coal Mining Co., at Windber, Pa., a cutting machine has been placed in operation which differs radically from those in use in other mines of the United States. It is an adaptation of the rotary-disk coal cutter which is extensively employed in Great Britain for longwall mining. This rotary cutting machine was designed by Harris T. Booker, mine manager of the company, and his son, R. E. Booker. At present other machines of this type are being built in the shops of the Eureka No. 35 mine.

The rotary cutter is a compact, wheel-mounted machine that weighs about 500 lb.—a surprisingly small weight for a machine of its class. Electric or air-operated coal punchers, adaptable to the same working conditions as this machine, weigh far more. Like the coal puncher, this cutter is adaptable to thin seams, especially those with rolling bottom, where chain machines cannot be used. No claims are made of its being practicable for use in thick beds except where the roof being bad timber must be set close to the face or where ribs and stumps in squeezed sections are to be withdrawn.

Minimizes Lost Motion and Vibration.

The principle of the mechanism is simple and the moving parts have ample bearing surface, so that there will be no unnecessary lost motion or vibration. Motive power is furnished by a standard 2-hp. series-wound direct-current motor inclosed in a cast-iron housing and controlled by a standard boxed-in snap switch. Although the motor covering is not provided with air ducts the temperature of the machine within has never risen beyond a safe limit. The motive power is transmitted through a 1-in. steel shaft incased in a substantial, finned bearing tube that is firmly secured to the motor housing.

Because the shaft is underslung, its center line being but a few inches from the contact point of the carriage wheels, the machine is well adapted to undercutting. The resulting vertical flexibility increases its possibilities on a rolling bottom. On the motor end the shaft is actuated through a small cut-steel pinion and gear. On the head end the rotary motion is transmitted to the cutter plates through a small cut-steel bevel pinion and two gears that rotate in opposite directions. These gears are centered and bolted onto the cutter plates.

The cutter head proper is secured to the shaft tube by means of a sleeve held rigidly in place by two setscrews. This arrangement permits the head to be set horizontally for undercutting or vertically for shearing, this change being accomplished in a few moments by loosening the setscrews, swinging the head through 90 deg. and retightening the screws. The cutter plates

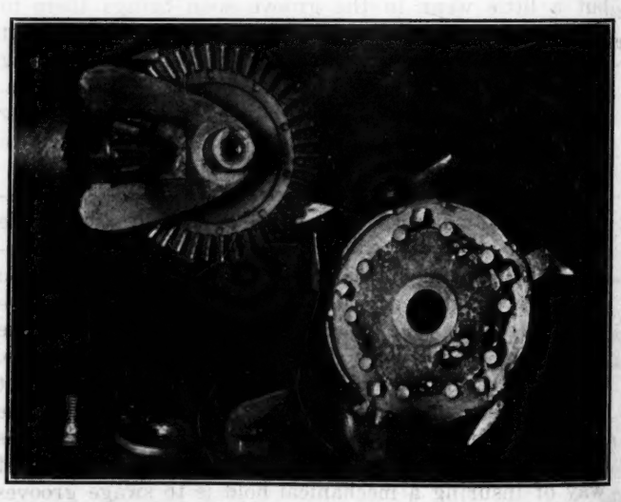


FIG. 1. CUTTER DISK AND CONNECTION TO SHAFT
Bits are secured in radial slots of rectangular cross-section by means of setscrews. Each cutter plate has three outside clearance bits and two center bits.

*Bituminous editor, *Coal Age*.

FIG. 2

Disk Coal Cutter

This machine is wholly different from that used in Great Britain, which has a much larger disk and is not set on wheels. Lightness, low cost, safety and simplicity are the qualities that are most apparent in this machine. It is interesting to see the old machine board return again as an adjunct in coal mining.

are provided with bronze bushings that bear upon a heavy shaft and are held in place by washers and countersunk screws. This arrangement readily permits the removal of one or both cutter plates.

The bits used are similar to those of a chain machine and they are placed in the same relative position to one another. As shown in Fig. 1, the bits are secured by means of setscrews in radial slots of rectangular cross-section. Each cutter plate holds three outside clearance bits and two center bits. The bevel pinion imparting opposite rotation to the two cutter plates lessens the muscular effort on the part of the operator in directing the machine. The bits of the respective plates move toward each other and grip the coal.

Two marked advantages result from this action. The gripping tends to pull the machine toward the face, making the feed almost automatic. Practically no recoil is set up because the machine is held to the face by its own action. Consequently, as shown in Fig. 2, where the machine is set up for operation, no foot blocks are required. This removes one difficulty ordinarily encountered by the operator and enables him to concentrate his attention upon cutting. It must be conceded that hand-directed cutters may be handled more intelligently than those mechanically fed, and this advantage obtains to a greater degree where foot blocks are absent than when they are present.

Cutter Mounted on Eighteen-Inch Wheels.

When undercutting, the machine body rests upon a 1½-in. axle fitted with 18-in. truck wheels. Of course, for the purpose of shearing, wheels are provided that are of large diameter. The axle is located directly under the center of gravity of the body so that a perfect balance is obtained.

The designers of this machine contemplate several minor changes in the mechanism. These will include guards on the cutter head to prevent dust from getting into the gears, and a large shaft and supporting tube so that the depth of cut may be increased. The cutter plates will be made of larger diameter and the number of bits will be increased to eight on each plate. After these alterations the machine will cut with greater efficiency because of the increase in the number of blows or incisions per revolution of each cutter plate and the establishment of a longer fulcrum. The action then produced will more nearly approach that of a hand pick. The bits together with their slot arrangement also will be changed. The pronged center bit will be discarded and the pick-pointed cutter used exclusiveiy. The bit stems will be straight instead of bent, the necessary side clearance being secured by slanting the bit slots.

Little Dust, No Recoil and Light Weight.

This machine has many merits hitherto unattained by other devices intended for the same purpose. These may be enumerated as follows: (1) It stirs up no dust and gives off no smoke or objectionable heat; (2) there are only four places to lubricate; (3) it makes cuttings similar to those produced by hand picks, there being no fine bug dust; (4) the control and operation is simple; (5) there is no recoil and consequently foot blocks are not required; (6) the weight is comparatively small.

By the aid of this machine headings may be driven with great rapidity, as the cuts can be made and loaded out in rapid succession, the loader of the coal also operating the cutting machine. In such work it will do the cutting about as fast as eight men with coal picks could do it. A simple construction and the entire absence of all electrical resistance, the motor being thrown directly across the line by means of a snap switch, render this machine peculiarly adapted to operation by unskillel labor, of which there is an abundance about the mines.

H. H. Stoek, of the University of Illinois, has been engaged by the Bureau of Mines to assist F. R. Wadleigh with the investigation of coal storage being made jointly by the Bureau of Mines and the Department of Commerce. While one of the objects of the survey is to have more exact data with regard to existing storage facilities, the main purpose of the work is to develop facts which will demonstrate the advisability of coal storage and thereby encourage it.

COAL AGE INDEX

The indexes to "Coal Age" are furnished free to all who ask for them. The index for the first half of 1922 will soon be ready for distribution, and a copy can be had by addressing a postcard to the subscription department of "Coal Age."

Book Reviews

Practical Mine Ventilation

MINE ventilation has too often been treated from the point of view mainly of mine gases and of distribution of air, and the matter of production of air pressure has been left to the manufacturer. A few pretty pictures of fans have lightened the text of many former volumes on this subject, but the author, not being a fan expert, satisfied himself, or rather tried to rest satisfied, with the most meager details regarding the originating means for ventilation, mauger, it is true, of several pages on steam jets, furnaces and the trompe, which are wholly inadequate means of inducing an air current.

This book, written by J. R. Robinson, gives the fan its appropriate place without in any way being a catalogue of types. It supplies calculations in connection with the selection of fan size that will be of value to any reader who has to ventilate mines.

Interesting among his remarks are those on the correction of friction of air. Giving Atkinson's, Fairley's and Murgue's coefficients (k) as 0.0000000217, 0.00000001 and 0.000000009 respectively, Mr. Robinson adds: "These coefficients are the result of experience and are practical, but they can be used only by those who have a wide experience and knowledge of mining conditions. It will be observed that Atkinson's coefficient is nearly 2½ times Murgue's, and unless the engineer has a wide experience he does not know which coefficient to use on the particular mine that is the subject of the calculation. The author has had some mines come under his observation wherein the coefficient $k=0.000000069$ and others where the coefficient$=0.000000006$, the last figure being less than 10 per cent of the former. The coefficient $k=0.000000006$ will apply to airshafts that are well lined."

The book clearly shows the disadvantage of having a fan ill-fitted to the mine conditions. This is an important subject, and little has been written about it. It is fully time to get books written by manufacturers of fans to supplement those the authors of which are mine engineers, professors and theorists. The point of view is one that cannot be neglected with safety. Too often the manufacturer of mine equipment fails to publish what he knows about the practical problems of the mine, and the industry is the loser.

Interesting statements are that excessive quantities of air absorb the moisture of mine surfaces and make the mine dangerous, that large cavities in the roof of roadways simply result in baffling the air, that regulators are a great source of power loss, that the use of auxiliary fans is preferable and that these "boosters" serve to lengthen the life of primary fans. The use of regulators, so to speak, lays a tax on the whole mine so as to protect and make possible the ventilation of a split that is unusually difficult to ventilate. It is better to aid the air through that split than to burden the whole mine with an excessive water gage for that purpose.

In the case of the Federal Coal Co.'s mine at Grant Town, where it would have been necessary to use 11.87 in. of water gage to pass the 300,000 cu.ft. per minute needed in place of the 132,000 cu.ft. which 2.3 in. of water gage permitted to be passed, the management found a way to cut in an airway, and through this an air current circulated, reducing the pressure 25 per cent. Other practical instances are given where attention to ventilation has made great economies.

A most valuable table is provided by W. H. Hall, of Coalwood, W. Va. He shows the most economical size of shaft to deliver 100,000 to 600,000 cu.ft. of air by 100,000 cu.ft. increments. Thus 100,000 cu.ft. of air calls for a 10 x 10-ft. shaft; 200,000 cu.ft., a 14 x 14-ft. shaft; 300,000 cu.ft., a 16 x 16-ft. shaft; 400,000 cu.ft., an 18 x 18-ft. shaft; 500,000 cu.ft., a 20 x 20-ft. shaft, and 600,000 cu.ft., a 22 x 22-ft. shaft. The depth of the shaft is taken as 100 ft., excavation is figured at $15 per cu.yd., concrete lining at $30 per cu.yd., life of mine at 50 years and power at 2c. per kilowatt hour.

Mr. Robinson has allowed himself to be a little discursive. He has several pages on the mechanical and historic development of the coal industry from its earliest beginnings. The story is well told and exceedingly interesting, for the coal industry is the mother of the mechanical arts. The steam engine, the pump, the railroad, the locomotive, and the fan were built largely for her service and by her engineers. The only misfortune is that having done so well in earlier years, mining engineering has been willing of late to be boosted from outside instead of by the exercise of her own activity.

This little volume, entitled "Practical Mine Ventilation," contains 225 pages measuring 5½ x 8½ in. and may be obtained from its publisher, J. R. Robinson, 6027 Jenkins Arcade Building, Pittsburgh, Pa.

Gas and Fuel Analyses

AS PART of the International Chemical Series appears a second edition of the book by Alfred H. White, professor of chemical engineering at the University of Michigan, on "Gas and Fuel Analyses," a book of 319 pages measuring 5½ x 8 in. The main stress is placed by the author on gas analysis, liquid fuel having only 20 pages and coal, which is last in the train, having 86 pages committed to it.

Mr. White points out the difference in the heating value of coal which passes over a ¾-in. screen and of that which goes through. The screenings gave, in all but one of the ten cases instanced, less heating value than the larger coal. In one instance—Blockton, Ala.—the screenings gave 1,646 B.t.u. less heat than the larger coal and in the Oak Creek (Col.) coal 1,366 B.t.u. more heat than the lump coal would give. The difference in each case is attributable to the impurity of the coal that has the lower heat equivalent. Screenings in the first instance ran 14.91 per cent ash, whereas the lump had only 4.41 per cent. In the second instance the lump had 15.67 and the screenings 6.97 per cent only. Where the coal is cut in the clean part of the seam the fine coal is quite likely to be of superior purity, especially if floor and roof are of a character that they can be kept out of the coal.

The chapters on coal analysis give instructions regarding care in sampling, analysis, drying and the ascertainment of heating value, using Parr or other bomb calorimeters.

Housing for Coal-Mine Workers

INDUSTRIAL housing has made large advances in recent years and the art of building suitable villages for operatives is a study in and by itself. Too many wander into it without any equipment for the work and may welcome a book by Morris Knowles on this subject entitled "Industrial Housing." The volume contains 408 pages measuring 6 x 9 in. It contains a historical review, chapters on fundamental preliminary considerations, on the selection of a site, on the development of the town plan, on streets and pavements, on water supply, on sewerage and drainage, on collection and disposal of town wastes, on gas and electric service, on houses for families, on other buildings, on the administration and supervision of construction and on the management of industrial towns.

The practice is to regard the cost of the house as the cost of housing. In three tables it is shown that the houses cost 70, 81 and 81 per cent respectively of the whole investment in three separate housing developments. Taking one instance—the first—the land cost 1.6 per cent; street grading, the same; street paving (tar-bound macadam), 3.7 per cent; concrete sidewalks, 1.7 per cent; waterworks, 3 per cent; sanitary sewers, 2.6 per cent; storm sewers, 1.1 per cent; supervision and engineering, 8.6 per cent, and interest during construction, 5.7 per cent—a total of 100 per cent. It is just as well to face the fact sooner or later that the house is only three-quarters of the problem.

Inspectors' Institute Advances Art of Mine Safety

Proposes Uniform Underground Danger Signals—Urges Standard Methods of Sealing Off Abandoned Areas and of Gas Testing—Elects R. M. Lambie of West Virginia, President

BY E. W. DAVIDSON*

SOME definite contributions to the art of making coal mines safe and to the business of keeping them so were made at the thirteenth annual meeting of the Mine Inspectors' Institute of America, held in Chicago, July 11, 12 and 13. The Institute, after careful consideration in committee and after much earnest and expert discussion, made four recommendations for standardized methods which it hopes will be adopted and made uniform throughout the land. Also it adopted resolutions of sorrow upon the deaths, during the past year, of two charter members of the Institute, Thomas K. Adams, of Pennsylvania, and Walton Rutledge, of Illinois, father of Dr. J. J. Rutledge, mining engineer, U. S. Bureau of Mines.

Before final adjournment, the Institute selected Pittsburg, Kan., over Pittsburgh, Pa., as the place for holding the next meeting, July, 1923, and elected R. M. Lambie, chief mine inspector for West Virginia, president for the coming year, succeeding C. H. Nesbitt, chief inspector for Alabama. Twenty-two members of the Institute attended the meeting, many of them declaring at its close that the gathering had brought out its usual quota of good ideas and concrete results.

RECOMMENDS STANDARDIZATION OF METHODS

The four definite recommendations of the Institute of methods that should become standard were the following:

(1) That a new type of underground danger signal proposed be adopted.

(2) That worked-out and abandoned portions of mines either be thoroughly ventilated or sealed off with a masonry wall provided with a valve permitting periodic tests of the atmosphere within; and that such areas have vents drilled through from the surface.

(3) That tests for gas be made with a non-luminous flame, using a flame safety lamp of one of the types approved by the U. S. Bureau of Mines, and burning fuel also approved by the Bureau, for each specific type.

(4) That in cases where machine runners are equipped with electric lamps, men possessing certificates of competency as gas inspectors test every working place before a machine starts to work in the place, and make another test either during the machine run or immediately thereafter.

During the discussion that preceded the first recommendation much was said about the confusion which exists between parts of the country in the matter of underground danger signals. There are so many "codes" that men transferring from one region to another might easily misunderstand them, with disastrous results. There is a danger also in the effort commonly practiced to register the degree of danger that may exist, as "bad gas," "little gas" and the like. Since gas is gas and since a man's judgment of quantity may easily be in error and lead some foolhardy soul into deep danger where only slight danger is expected, the Institute held that the new signal proposed should be one that would make the nature of the danger unmistakable, but should not attempt to indicate its degree.

Hence the Institute recommended that in all mining regions an underground signal of the following description be made uniform: A square divided into four quarters by two lines drawn from opposite corners so as to cross at the middle. Each quarter of the square should be devoted to a single class of dangers: Thus, the upper left-hand quarter should be devoted to gas; the lower left-hand quarter to bad roof; the upper right-hand quarter to electric wires and the lower left-hand quarter to "blackdamp."

With this arrangement made uniform it would be possible for any man who is capable of making a cross to chalk up a danger warning that all would understand. If a man's ability to write the English language was too limited to enable him to write "gas" or "bad roof," or "electric wires down," or "blackdamp" on the sign, he would merely need to put a cross in the proper quarter of the sign and the warning would be complete.

The sign could appear in any number of forms, either commercially manufactured or "home-made" of metal or wood, or merely painted or chalked or scratched on any prominent surface. The committee which brought in the recommendation for this sign consisted of V. E. Sullivan, of West Virginia; James Dalrymple, of Colorado, and Thomas Back, of Illinois.

In the discussion on how best to handle abandoned parts of mines the members of the Institute reviewed the laws and practices of various states and finally endorsed the present Pennsylvania practice, which is essentially that recommended to the whole country by the Institute. The committee which reported the plan for adoption was Dr. J. J. Rutledge, of Illinois; John G. Millhouse, of Illinois, and Frank Hillman, of Alabama.

The Institute continued its discussion of last year on standardization of inspection forms and received from a committee a model form containing a schedule of discounts based on the mining laws of Kansas. This schedule, of course, would have to be modified in accordance with the provisions of each state for use in that particular state. Ralph C. Becker, of Pittsburgh, Pa., told the Institute that the committee on standardization of coal-mine equipment of the American Mining Congress is advancing its work steadily and wants the wholehearted co-operation of coal-mining men everywhere. This committee, whose herculean job will last for about five years, will make an annual report at the next meeting of the Congress, to be held at Cleveland, Ohio, in October.

REAFFIRMS STAND ON USE OF MIXED LIGHTS

The Institute reaffirmed its position taken last year on the use of mixed lights in mines. It holds that portable electric lamps should be used for general lighting and flame safety lamps always for testing. C. L. Colburn explained a uniform plan for the collection of data on mine accidents and proposed a uniform report form for all states for the use of inspectors, compensation commissions and other such officials. After a discussion on the relative importance of subject matter in mine inspectors' annual reports the Institute decided that statistics and conclusions on accidents and accident prevention were by all odds the most important, that production should take second place, and men employed, third.

A lengthy discussion on the relative merits of water and rock dust as preventives and restricters of explosions did not result in any definite recommendations by the Institute.

The full list of officers chosen for the year 1922-23 follows: President, R. M. Lambie, chief mine inspector of West Virginia; First Vice-President, W. E. Holland, district mine inspector of Iowa; Second Vice-President, James Sherwood, chief mine inspector of Kansas; Third Vice-President, James Dalrymple, state coal mine inspector of Colorado; Secretary, J. W. Paul, mining engineer at the Pittsburgh Experiment Station of the U. S. Bureau of Mines, and who has been secretary since the conception of the Institute 14 years ago; Assistant Secretary, J. G. Millhouse, district mine inspector of Illinois; Treasurer, Frank Hillman, former district mine inspector of Alabama; Editor-in-Chief, J. T. Beard, associate editor of *Coal Age*, New York.

*Western editor, *Coal Age*.

Problems of Operating Men

Edited by James T. Beard

Timbering in the Pittsburgh Seam in Ohio

Nature of Strata Overlying Coal—Avoid Breaking Topcoal—I-Beams Set in Hitches Cut in Drawslate Support Roof—Use of Concrete Blocks for Timber

REFERRING to the inquiry of "Mine Engineer," entitled "Timbering in the Pittsburgh Seam," published in *Coal Age*, May 25, p. 886, allow me to suggest a method of timbering that has been found satisfactory by some of the larger coal companies operating in the Pittsburgh coal, in Eastern Ohio.

Before proceeding, however, it would be well to specify more definitely the nature of the strata overlying the coal. The inquirer has given but a partial description of the character of the upper strata, which would hardly enable operators in other fields to fully appreciate the situation.

As has already been stated and as shown in Fig. 1, overlying the coal which averages 5½ ft. in thickness, there is a 12-in. drawslate that is taken down as the working face is advanced.

Above the drawslate is a thin seam of coal verying from 4 to 27 in., in thickness. In most cases, this topcoal is marketable. It is overlaid with from 16 ft. to 18 ft. of limestone and shale, above which is the well known "Redstone Formation." In working the Pittsburgh seam, what is of the first importance is to avoid breaking the topcoal, if that is possible. By that means, the air current is prevented from coming in contact with the shale and limestone. Experience has proved that if this thin upper coal can be held intact, the top will stay up without timbering from six to eight months. Where the mine is dry, indeed, the top has been known to stand for four or five years.

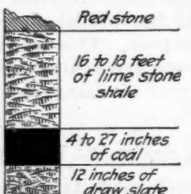


FIG. 1. SECTION THROUGH SEAM

There are times, however, when the roof conditions are so bad that it is practically impossible to avoid breaking the topcoal and, in that case, it is necessary to adopt a suitable method of timbering on the roads.

A method that has proved most satisfactory is that shown in Fig. 2. As there appears, hitches are cut in the drawslate 8 in. wide and 6 in. deep. A 6 in. I-beam is then placed in these hitches and built up to the required height, by placing beneath each end of the beam one or more courses of common brick resting on top of the workable coal.

The use of steel I-beams in place of timber has proved to be the most economical, in the long run, although the initial cost of the steel is about one-third greater than for timber. But, it must be remembered that the life of timber, in this connection, is from six

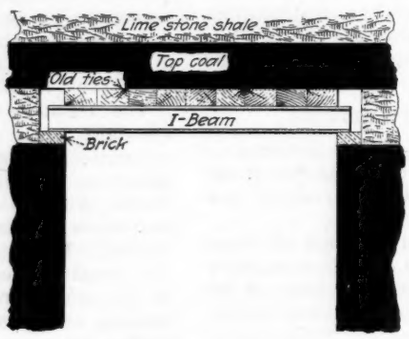


FIG. 2. SUPPORTING THE TOP COAL

months to a year, while that of the I-beams is practically indefinite, as at least 50 per cent or more of these beams are recovered, on retreating.

Lagging to Support the Roof

As shown in Fig. 2, lagging is used above the I-beams to give better support to the roof. For that purpose, second-hand track ties are often used. Ties taken from low damp places are generally found to last longer than dry timber, under the same conditions.

Where the height to be timbered is greater than 12 in. it is necessary to use more brick under the crossbeams. In many cases, concrete blocks varying from 6 to 18 in. in length are made and brought into the mine to serve as legs for the support of the crossbeams. These blocks are usually made in large numbers so that a sufficient supply is always on hand.

In this method of timbering there is nothing to decay except the lagging, which is readily replaced when needed. Regarding a more satisfactory method of cutting the hitches than the use of a pick, it should be stated that the latter is commonly used. It is possible however, that the use of a "Little-Giant" chipping hammer, such as that manufactured by the Chicago Pneumatic Tool Co., and advertised in the eleventh Annual Equipment Number of *Coal Age*, p. 131 of the advertising section, may prove useful in that connection.

H. J. GRIFFITH.

Piney Fork, Ohio.

ANOTHER LETTER

HAVING had considerable experience in handling roofs under the conditions described in the inquiry relating to timbering in the Pittsburgh seam, kindly permit me to offer a few remarks that may be of interest.

In this connection, my first thought is that when contending with a soft roof of this character, it is not advisable to drive the entries 10 ft. wide, as indicated by the sketch presented in the inquiry.

Two Plans Suggested

My observation is that, in cases of this kind, entries are never driven more than 8 or 9 ft. in width, and the timbers are set back into hitches cut in the ribs of the entry, where they will not be liable to be knocked out. I would suggest two methods, either of which would be applicable under the conditions described.

In the first place, steel I-beams could be used as crossbars for the support of the roof. Or, if available, heavy sections of old rails can be employed to advantage. These can always be recovered and used over and over again, when the road is to be abandoned.

A good plan is to make a hitch-hole, in the slate above the coal, and a slip hitch-hole, in the slate in the opposite rib, using a good cap-piece on top of the coal, as a rest for the I-beam. Another method, which is commonly employed, is to cut hitches in the ribs for the posts on either side of the road.

Use of Jacks in Timbering

Where a large amount of timbering is to be done it would, no doubt, be convenient and greatly reduce the cost, if the timberman is supplied with two portable light jacks made out of pipes. These can be made by any handy blacksmith and will save time and labor in placing the beams or sets of timber, as the jacks can be made to hold the crossbars in place while the cap-pieces are being driven under the I-beams, or the posts fitted under the timber collars, as the case may be.

Regarding the suggestion of cutting the hitches by some other means than

picks, it would be a simple matter to use a small puncher operated either by electricity or compressed air. Such a tool would largely reduce the manual labor and cost of timbering.

ANDREW O. BAIN.

McKeesport, Pa.

UNDER the conditions stated as existing in the Pittsburgh seam, in Eastern Ohio, it is my judgment that different methods of timbering must be considered and that form adopted which is found best suited to those conditions.

On all main and branch roads, I would recommend an electric mine-car compressor and air hammer, for digging the hitches in the drawslate above the coal. Coal should be placed in these hitches and tightened by driving small blocks or wedges beneath them and doing away with the posts.

On main roads, where the conditions might require or circumstances permit, I would use steel I-beams of a size suitable to carry the weight of the overlying strata. Where railroad ties were available, 6 x 8 in. or thereabout, these could be used for timbering on branch roads.

In every case, the distances of the timber sets or crossbeams must be determined by the strength and character of the roof to be supported. At times, I have used oak boards, for lagging above the collars. Where the width of the roadway will permit, it will often be found more economical to use full-length legs to support the collars, instead of cutting hitches and using short legs as mentioned in this inquiry of "Mine Engineer."

RICHARD MACDOUGAL.

Pittsburgh, Pa.

AFTER reading the inquiry of "Mine Engineer" and his description of timbering in the Pittsburgh seam, I realize that his chief difficulty is the expense of cutting the hitches in the ribs, for the support of the legs forming a timber set.

The suggestion made by the editor in his reply, namely, to incline the short legs toward the center, has the advantage of reducing the work of cutting the hitches about one-half. In this case, the coal being 5½ ft. thick gives a headroom of 6 ft. under the collar, which eliminates what objection there might be to inclining the legs in this manner.

In my opinion, the cost of cutting hitches can be further reduced by making the cut wholly in the drawslate and resting the collars on top of the coal, instead of using the short legs mentioned. The collar should then be tightly wedged to hold it in place.

In Tennessee we have tried most of the different forms of timbering. One that we have found well adapted to conditions of this kind is to cut a good hitch in the drawslate just above the coal, on one rib. Insert one end of the bar in this hitch and rest the other end on a leg notched into the bar.

Wilder, Tenn. OSCAR H. JONES.

Setting Post Timber

Need of setting posts firm—Conditions when roof and floor are hard—Effect of roof settlement.

REFERENCE was made in *Coal Age* some time ago, in answer to a question regarding the methods of setting post timber when both roof and floor are hard; and it was stated that one plan is to set the posts on a mound of dirt or other soft material that will yield when the post first takes the weight.

Long experience has taught me the need of setting a post firm. It strikes me that it would be impossible to do this when the timber is to be stood on any soft material such as dirt or slack. It has always been my practice to use a good cap-piece of soft wood that will enable the post to be driven tight and firm in its place.

THICK CAP-PIECES AND FOOT-BOARDS AVOID CRUSHING OF POSTS

For example, when setting a 6-ft. prop, 8 in., in diameter, in a mine where the roof and floor are hard, I would set the posts on a 4-in. footboard and use a good cap-piece of the same thickness, on top of the post. This would make the post firm and solid.

Then, when the weight comes on, it will squeeze the cap-pieces 3 in. or more before it will break the post. I find that we can count on a yielding of 5 or 6 in. in taking the weight, when a post is set in this manner, which appeals to me as a far better plan than to set the posts on soft mounds of dirt.

LAWRENCE CABODI.

Carbonado, Wash.

[In this connection, the reply to the inquiry of a timberman, explaining some of the basic principles of post timbering on the following will be read with interest.—EDITOR.]

Firebosses' Markings

Requirements of the Bituminous Mine Law—Purpose of making two marks in a place—Investigation made in absence of fireboss.

REFERRING to the discussion regarding the marks of a fireboss made on the face of the coal and destroyed by a fall of roof that occurred before the time for the men to enter the mine for work, allow me to refer to the Bituminous Mine Law of Pennsylvania, covering this point.

The law requires (Art. 5, Sec. 1) that the fireboss "shall examine for danger in all portions of the mine under his charge, and after each examination he shall leave, at the face and side of every place examined, the date of the examination as evidence that he has performed his duty."

The provision that a mark shall be made on the side of a place examined, in addition to the one made on the face, I believe is for the purpose of avoiding such a situation as is here presented. In my opinion, a fall of roof large enough to obliterate both marks could hardly take place within the three hours allowed, by law, for the morning inspection, without the place exhibiting some sign of danger at the time the fireboss made his visit.

Now, inasmuch as the law requires the fireboss to "examine for danger in all portions of the mine under his charge," no fireboss fulfills his duty, under the law, when he makes a test for gas and does not also make a careful inspection of the roof and the face of the coal and observe if any timbers have been discharged by the shots fired the night before, and note other dangers that may exist.

REPORT MUST SHOW DANGERS FOUND

In this instance, it may be assumed that a close inspection would have revealed broken timbers; or posts set contrary to the regulations of the mine; or an unsafe condition of the roof as revealed by sounding; or the presence of slips in the roof. Any of these dangers, if found, should be entered on the report of the fireboss and prompt measures taken to avoid accidents therefrom.

Assuming that both of this fireboss' marks were destroyed, it is my belief that his report should reveal some one form of danger such as I have mentioned, provided his inspection was properly made. The fact of any danger being noted in the report regarding the place would be sufficient evidence that the fireboss had been there the same morning.

While it is admittedly possible that a careful examination of the place did not reveal any apparent danger and the roof fell within the three-hour period following, such an occurrence would be unique, to say the least. In any event, justice to the fireboss demands the consideration of any circumstantial evidence there may be that he had examined the place in the regular routine of his duties.

The investigation that must follow such an occurrence should be made in the absence of the fireboss, who should not be premitted to enter the mine while the same is in progress. Every place in the district of which he has charge, should be examined in order, and his marks noted, as well as the condition of each place, in respect to danger. Assuming the investigation showed all other places properly examined and marked, I believe any jury of mining men would clear the fireboss of suspicion.

JOHN WALL, SR.

Bayview, Ala.

ANOTHER LETTER

REGARDING the question of firebosses leaving their marks in each place examined, as evidence that they had inspected the place, allow me to refer to some incident in my own experience along this line. It may not be policy for a fireboss to place his mark on the roof, at the coal face, unless it is hard and firm, but I have known many such instances.

In one case, which was told to me a short time since, a miner who had been injured by a fall of roof at the face of his room, attempted to recover damages from the company, claiming that the fireboss had not inspected his place that morning and he was not warned of his danger.

It so happened that the fireboss had been accustomed to mark the roof of each place examined, instead of placing his mark on the face of the coal, as is often done. To prove his case, the fireboss got busy and cleaned up the fall. When a large rock, lying on the pavement, was finally reached and turned over the mark was found, showing the date and the initial of the fireboss.

Some will claim that the roof is not the proper place for a fireboss mark. Many place their mark on the timbers. I have known some to stand a shovel upside down and put the mark on the back of the blade. It is the custom of many firebosses and safety inspectors to mark a cross on a piece of loose top to indicate that it must be taken down or made secure with timbers. For this reason, if a fireboss should mark the date of his inspection on the roof it may be confused with the mark indicating bad top, and it would be better to use other means of making the inspection mark.

Bulletin Boards in Working Places Serve Good Purpose

Some years ago, while firebossing, I had bulletin boards prepared to facilitate and make legible my record of inspection. These boards were 12x18 in. and had a hole bored at the upper end so that they could be hung on a nail on a post. Each miner was made responsible for the keeping of his board. It was his duty to move the board back four or five posts before firing his shots at the close of the day, so that it would be out of danger from flying coal.

When making his rounds in the morning, the fireboss would move the board forward, mark the date and hang the board on a post next to the face of the coal to show that he had examined the place and it was safe for work. This method proved highly satisfactory to everyone. Whenever there is a hole in the roof or other place where gas might accumulate, a mark should be made at the highest accessible point to indicate that a gas test has been made there.

Talk is cheap and life and health are valuable. Therefore, bad roof and other dangers should always be marked to indicate their presence. Every fireboss should see that his mark of inspection is where a miner will see it on entering his place. Again, another mark should be made at the coal face or at any point of danger, to show that such point had been reached and examined. A fireboss must arrange to remove any danger found and prevent the men from entering the place until that is done.

Thomas, W. Va. W. H. Noone.

Inquiries Of General Interest

Principles Relating to Post Timber

Initial Settlement of Roof Irresistible—Resistance to Crushing and Bending Equal in Post Timber—Means Employed to Avoid Destruction of Posts When the Roof Weights.

CONDITIONS in the mine where I am employed as timberman have been such as to require their special study. In one section of the mine recently developed, much trouble has been caused, owing to timbers being destroyed by the roof pressure, soon after the posts were set. The coal is 6 ft. in thickness and the seam generally flat and overlaid with a cover of shale, slate and sandstone, varying from 250 to 300 ft. in depth.

For some time, I have been seeking information regarding the essential principles of timbering rooms. My chief trouble lies in dealing with a hard roof and bottom. It has always been my practice to use good cap-pieces when setting post timber, but these do not seem to serve the purpose as fully as they should when the timbers take the weight.

Timberman.

————, Ia.

One of the first principles that a timberman should learn to respect is the fact that when the coal is taken out from a portion of a seam, as in driving rooms and entries, there always follows a certain settlement of the overburden resting on the pillars. This is not a sagging of the roof over the opening, but a body settlement due to the weight of the overburden squeezing the pillars on which it rests.

This first or initial settlement of the roof is irresistible and no amount of

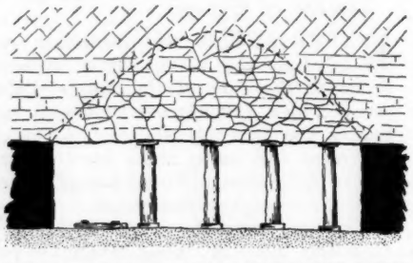


FIG. 1. OVERARCHING OF MINE ROOF WHEN DRIVING A ROOM

timber can prevent it. Its extent will vary with the depth of cover, thickness of seam, hardness of coal and ratio of pillar to opening. Calling the entire area, in a given section of a mine, A; and the area of opening, in the same section, a, the increase of roof pressure due to the taking out of the coal is in the ratio A : a, or A/a.

One thing to be remembered is that post timber is never intended to carry the weight of the cover above it, which is far in excess of the strength of the timber. In Fig. 1, we have attempted to illustrate the condition that results from driving an opening in a seam of coal. The strain resulting from the taking out of the coal has the effect to crevice the strata above the opening, and the loosened material then overarches the opening, as indicated by the dotted line.

This overarching of the roof acts to support the entire overburden above, throwing its weight on the pillars on either side of the opening, while the weight of the loosened material beneath the arch is held in place by the timbers set to support the roof. The height of the arching is wholly dependent on the character of the formation overlying the coal.

When setting post timber in a mine a practical timberman will never drive

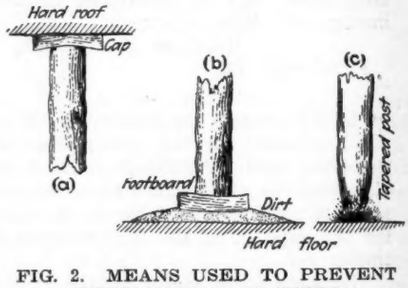


FIG. 2. MEANS USED TO PREVENT DESTRUCTION OF POSTS

a post tight, between the roof and floor, without providing a good cap-piece above, which will yield and prevent the crushing of the post, when the weight comes on the timber. This is particularly true when either the roof or the bottom, or both, are hard. If there is no yielding material provided to take up the first settlement of the roof, as here mentioned, the post will be destroyed by this irresistible pressure.

Some years ago, mine inspector Hepplewhite proposed a method of avoiding the destruction of post timber, by tapering the foot of the post. This method was very largely employed in England, but has never been used to any great extent in this country. A method that has been more commonly used in American mines, aside from providing a good cap-piece against the roof, is to set the post on a footboard placed on a low mound of

dirt or slack, an inch or two in thickness. This method has a particular advantage in enabling the quick removal of a post when desired, by digging out the slack with a pick.

In the accompanying sketch (Fig. 2), is shown, at (a), the effect on a good cap-piece caused by the weighting of the roof. At (b), is shown the bottom portion of a post resting on a footboard placed on a thin mound of slack or dirt. Again, at (c), is shown the effect of tapering the foot of a post, when the weight comes on the timber. The furring of the tapered end of the post provides the necessary yielding that prevents the destruction of the timber.

A good rule to apply in post timbering is to make the diameter of the small end of the post, in inches, not less than its length, in feet. Thus, a 6-ft. post should have a diameter not less than 6 in., at the small end. This makes the post present an equal resistance to crushing and bending. In other words, the post will not be crushed by reason of having too small a diameter for its length, or bend by reason of being too long for its size.

It is important in setting post timbers in a flat seam to set all posts plumb. Otherwise, any movement of the roof has a tendency to discharge the post. In inclined seams, the right position of the post is nearly normal to the strata, the timber being slightly inclined up the pitch from the normal. This is done to counteract the tendency of the strata to slip downhill, and prevents the loosening of the post should that occur.

Examination Questions Answered

Bituminous (Pa.) Mine Foremen's Examination, Held April 11-13, 1922

(Selected Questions)

QUESTION—(a) *How many workable seams of coal are there in the district in which you are employed?* (b) *Give the local name of each.* (c) *What are the characteristics of the roof in each seam?* (d) *What name is given to the coal measures in which they occur?*

ANSWER—(a, b, c) These questions must be answered according to the local conditions in any given district.

(d) The coal measures are known geologically as the "Carboniferous System."

QUESTION—*A ditch 18 in. wide and 12 in. deep is full of water. If the velocity is 2 ft. per sec., how many gallons are passing per minute?*

ANSWER—The sectional area of the ditch is $18 \times 12 = 216$ sq.in. A velocity of 2 ft. per sec. is $2 \times 12 \times 60 =$ 1,440 in. per min. The quantity of flow is, therefore $(216 \times 1{,}440) \div 231 = 1{,}346.5$ gal.

QUESTION—*What are the requirements in regard to the following*: 1, *Restrictions placed upon voltage for use in mines;* 2, *Switchboards;* 3, *Transformer rooms, underground;* 4, *Branch circuits;* 5, *Lighting circuits in the mine;* 6, *Joints in conductors;* 7, *Power wires and cables in shafts;* 8, *Cables in haulage roads;* 9, *Underground trolley;* 10, *Bonding?*

ANSWER—1. No higher than medium voltage (300 to 650 volts) shall be used underground, except for transmission or for application to transformers or other apparatus where the high-voltage circuit is stationary. In gaseous mines, high-voltage (exceeding 650 volts) transmission cables must be installed on intake airways, only; and high-voltage motors and transformers must be installed in suitable chambers ventilated by fresh intake air. All high-voltage lines and apparatus must be clearly marked to indicate their danger, the danger signals being placed at frequent intervals. Curves or signal wires must not exceed 24 volts.

2. Main and distribution switchboards must be made of insulating, incombustible material such as marble or slate and installed in as dry a position as possible. All switches or other instruments used in connection with motors or apparatus of more than 50-hp. capacity, shall be installed on a suitable switchboard with a 3-ft. passageway in front. Similar equipment, not exceeding medium voltage, or 50 hp., may be separately installed if mounted on an insulating base of slate or other material.

With high-voltage connections behind the switchboard, the passageway there shall not be less than 3 ft. clear, the same being properly floored and kept locked by a door, at each end, that can be opened from the inside without a key.

With higher than medium voltage, there must be no live-metal work on the front of the main switchboard, within 7 ft. of the floor or platform, and the space before the switchboard must not be less than 4 ft. in the clear. Insulating floors or mats shall be provided for medium-voltage boards where live metal work is on the front.

3. Transformer rooms must be of fireproof construction. With higher than medium voltage, the entry circuit must be protected by an oil-break switch on each pole, equipped with an automatic overload trip. With medium voltage or less, each pole of the entry circuit may be protected by a switch and automatic circuit breaker; or fuses may be substituted for the latter, in case of lighting circuits and power circuits not exceeding 25-kw. All transformers must be provided with suitable ammeter, in either the primary or secondary circuits.

4. At the point where a branch leaves the main circuit, it must be provided with a switch of not less than 100 amp. capacity, on each pole.

5. Where incandescent-lamp wires are connected to the trolley circuit, the lug of the trolley hanger must be drilled to receive the lighting wire, which is secured by a setscrew. The lighting wire must not be wrapped or tied about the stem or stud of the trolley hanger, and must be grounded to the track circuit. All lighting wires must be adequately insulated and strung on porcelain or glass insulators, unless encased in pipes or other metallic covers. Separate uncased wires must be kept at least 3 in. apart, except where they enter the fittings and all metallic casings must be grounded efficiently.

6. All joints in conductors must be mechanically and electrically efficient and soldered, if possible; otherwise, a suitable screw clamp or other connector must be used. When the joint is complete it must be insulated to the same extent as the rest of the wire.

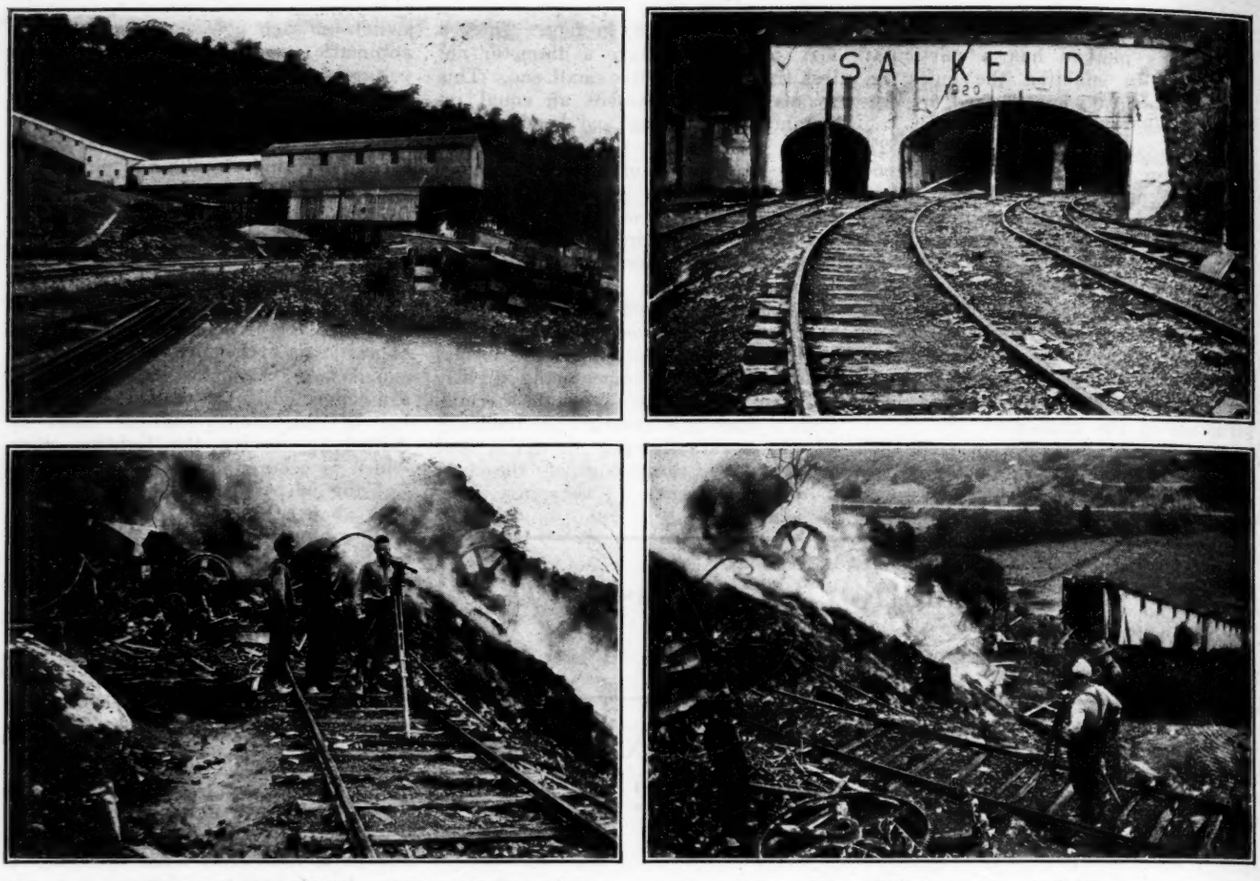
7. All power wires and cables must be well insulated and firmly fixed in position, being supported at intervals not exceeding 25 ft. where their strength is not self sustaining. Unless protected by boxing, space must be left between them and the sides of the shaft.

8. Conductors other than trolley wires, on main haulage roads, must be protected by proper guards, unless kept at least 12 in. from any part of mine car or locomotive. Unless provided with metallic covering, wire conductors must be hung on insulated fastenings.

9. On underground roads, trolley wires must be hung as far as practical to one side of the road and securely supported on insulated hangers, at points that will prevent a sag exceeding three inches, where the height above the rail is less than 5 ft. and the wire does not touch the roof when the trolley passes. All other wires except telephone, shotfiring and signal wires must be hung on the same side of the road with the trolley wire.

At all points where men must work or pass under trolley or bare power wires, less than 6½ ft. above the top of the rail, such wires must be properly protected. All branch trolley lines must be provided with an automatic trolley switch, or section insulator and line switch, or other device to cut off the current from the branch.

10. Both rails and main haulage roads must be bonded and cross-bonded, at points not to exceed 200 ft. apart.



Scenes at Salkeld Mine, Where Headworks Were Destroyed by Four Hundred Armed Strikers

At this mine, on July 17, four hundred well-armed foreigners attacked the men who were at work and killed the sheriff who, with deputies, was on guard. At least six of the attackers were killed. The mine is the property of the Richland Coal Co. and is located at Cliftonville, W. Va., near Avella, Pa., where most of the attacking party live. The picture on the top at the left shows the tipple and shed leading from the mine level. This was not destroyed. The illustration at the top on the right shows the drift mouth, which also apparently escaped injury. The two lower illustrations show the destruction wrought by the fire; that on the left shows the destroyed generator house. The attack was made on the sheriff, his deputy and twenty-one employees and deputy sheriffs, the first two having pistols and the others only riot guns and two rifles.

Pittsburgh Operators Announce Return to 1917 Scale Until Jan. 1, 1923

PITTSBURGH operators on July 20 posted notices announcing a wage scale effective until Jan. 1, 1923. The scale is that of 1917, known as the Washington scale, and is the one in effect during the months of 1919 prior to the strike of that year. In a statement given out by the association it is pointed out that under this scale loaders who worked steadily earned on an average $6.71 per day and that the average total earnings for nine months was $1,136.89. During the same period cutters had average earnings per day of $8.43 and the average total earnings for the nine months period was $1,491.16. These men worked 95 per cent of the time that the mine worked. Pick miners during the same period had average daily earnings of $7.60, and the average total earnings for the nine months period was $1,289.74. These men worked 92 per cent of the time that the mine worked.

Taking the first nine months of 1919 as a basis, it is found that for the corresponding period in 1920 the country produced 117.5 per cent while the Pittsburgh district produced but 83.8 per cent. In 1921 the country produced during the same period 85.4 per cent while the Pittsburgh district produced but 61.4 per cent, a great part of which was on contracts. The new scale will give the men steadier work and greater actual earnings at the end of the year than under the scale which was in effect during 1921, it is asserted.

Bituminous Coal Loaded Into Vessels at Lake Erie Ports During Season to End of June*

(In Net Tons)

Ports	Railroads	1922 Cargo	1922 Fuel	1922 Total	1921 Cargo	1921 Fuel	1921 Total	1920 Cargo	1920 Fuel	1920 Total
Toledo	Hocking Valley	1,179,017	29,241	1,208,258	1,661,310	42,441	1,703,751	430,429	6,306	436,735
	Toledo & Ohio Central	.....	.....	.....	452,256	12,487	464,743	273,447	18,074	291,521
	Baltimore & Ohio	1,433,897	31,949	1,465,846	930,561	26,178	956,739	166,456	7,924	174,380
Sandusky	Pennsylvania	768,563	17,986	786,549	505,505	14,594	520,099	205,543	3,791	209,334
Huron	Wheeling & Lake Erie	7,612	334	7,946	730,318	19,403	749,721	538,335	39,157	577,492
Lorain	Baltimore & Ohio	17,820	9,491	27,311	1,192,473	42,729	1,235,202	746,049	71,306	817,355
Cleveland	Pennsylvania	43,358	12,114	55,472	993,390	33,531	1,026,921	85,741	26,972	112,713
	Erie	.....	.....	.....	236,821	7,460	244,281	.....	.....	.....
Fairport	Baltimore & Ohio	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ashtabula	New York Central	31,083	9,163	40,246	630,706	24,347	655,053	204,936	59,783	264,719
	Pennsylvania	28,342	6,456	34,798	1,238,816	38,013	1,276,829	180,162	30,208	210,370
Conneaut	Bessemer & Lake Erie	42,257	743	43,000	412,201	5,887	418,088	709,702	14,033	723,735
Erie	Pennsylvania	28,607	13,789	42,396	476,619	21,642	498,261	26,050	27,028	53,078
Total		3,580,556	131,266	3,711,822	9,460,976	288,712	9,749,688	3,566,850	304,582	3,871,432

* Compiled by Ore & Coal Exchange, Cleveland, Ohio; H. M. Griggs, Manager.

Nearly All Coal-State Governors Pledge Aid to Harding

PRESIDENT HARDING sent the following telegram at 6 p.m., July 18, to the governors of twenty-eight coal-producing states calling upon them to maintain order and protect reopened coal mines:

"The proposal of the Federal Government to the United Mine Workers and the various coal operators, whose mines are under suspension, to submit all questions in dispute to a national coal commission for arbitration, has been declined. The mine workers declined as a body. The majority of the bituminous operators pledged unqualified acceptance. The anthracite operators filed unconditional acceptance. A minority of the bituminous operators accepted the principle of arbitration but made specifications which could not be considered.

"I had proposed that the operators and the mine workers in dispute should immediately resume coal production under the wage scales and working conditions which prevailed at the time of the strike on last April 1; that every question in dispute should go to a national commission to be composed of three representatives of the mine workers, three representatives of the operators and five representatives of the American people.

"It was proposed to make the commission the final authority on all disputes until next March, and meanwhile the commission was to inaugurate a searching inquiry into every phase of the coal industry, in order to recommend the way to maintained understandings between workmen and employers, to promote steady employment and assure a continuous and ample fuel supply.

"The failure to secure the acceptance of this proposal for a voluntary adjustment left me no other course but to invite the mine operators to return to their mines and resume activities.

"I trust you will find it consistent to second this invitation, if you have not already done so, with the invitation to all miners and operators to resume their work. This invitation should be accompanied by such assurance of maintained order and the protection of lawful endeavor as will give assurance to everybody concerned. I want to convey to you in this message the assurance of the prompt and full support of the Federal Government whenever and wherever you find your own agencies of law and order inadequate to meet the situation.

"Your State Government and the Federal Government are jointly responsible for maintained conditions under which free men, willing to work, may work in safety. We are responsible for the production and the transportation of a fuel supply ample for the necessities of the American people and the public utilities which serve them, particularly the railways engaged in interstate commerce. We must have ample coal to maintain industrial activity. We must have the coal necessary to the health, security and the activity of all the people.

"I recite to you these details because it is important to have it understood how far the Federal Government has gone in seeking a voluntary adjustment. Thus far there has been no challenge of the right of workers to decline employment, or the right of the employers to hire as they elect.

"Our present duty is to guarantee security in the exercise of these rights, security in all lawful operations, and afford a safe opportunity for the production and distribution demanded by the necessities of the American people.

"There has been no government assumption of a part in the dispute between organized workers and organized employers. I did offer the only available agency which I know to effect a settlement, and these good offices have not availed.

"It becomes necessary, therefore, in the name of common welfare, to invite protection in the fulfillment of that obligation which attaches to an American industry engaged in providing any public necessity, and to afford security to all men alike who are ready and willing to work and serve the common need. No cause is so important as that of common welfare, and there must be the suppression of every unlawful hindrance to the service of that cause. To the task of lawful protection and the maintenance of order the Federal Government pledges to you every assistance at its command."

In response to the President's request for full protection to operators in opening and operating coal mines in their states, Mr. Harding received replies from nearly all of the twenty-eight governors promising the fullest co-operation. Governor Morrison of North Carolina and Governor Ritchie of Maryland were exceptions. Governor Morrison said that it would be vain for him to invite the miners to return to work, and he would not do so, anyway. Governor Ritchie declined to take the action suggested, declaring that the traditions of the state are "those of a people who settle such matters without bayonets or rifles."

There is "no coal strike in Virginia," Governor Trinkle telegraphed President Harding. "Our mines are operating," the brief message concluded.

"Confirming my conversation with you," Governor Sproul, of Pennsylvania, telegraphed, "I again beg to assure you of the full co-operation of the Government of the Commonwealth of Pennsylvania in your plans as outlined."

"Indiana mine operators have been invited to resume operations," Governor McCray, of Indiana stated. "Ample protection will be given to protect life and property."

The message of Governor Morrow, of Kentucky, said: "Your position is unquestionably correct and should be unhesitatingly pursued. I will support and maintain it."

"All resources of West Virginia," wired Governor Morgan, of West Virginia, "have been and are available to afford protection to those who desire to engage in lawful employment."

Governor Davis, of Ohio, telegraphed: "The full authority of Ohio has been and is ready to be marshaled into action, including the employment of all military or civil measures that are requisite."

"All Kansas needs are being met," Governor Allen, of Kansas, gave assurance. "The Kansas Industrial Act forbids picketing of any kind, and there will be no difficulty in resuming full operations in the Kansas field."

Governor McRae, of Arkansas, thought "the President's message apparently requires no answer. Civil authorities seem to have the situation in the state well in hand."

"Co-operation with President Harding and the federal authorities to the fullest extent" was promised by Governor Shoup, of Colorado.

Governor Kendall, of Iowa, pledged "every resource of the state to the support of the program you have inaugurated for the relief of the coal situation."

"I am not apprehensive that any serious trouble will arise," wired Governor Taylor, of Tennessee. "Should necessity require, we are absolutely able and will take care of the situation."

Governor Robertson, of Oklahoma, said he would "cooperate fully" with the programme of the Federal Government.

"There is no trouble in this state," Governor Hart, of Washington, telegraphed, "and I have faith in the operators and miners that no condition precipitating a demand for Federal interference will arise."

"All coal mines are operating," according to the message of Governor Mechem, of New Mexico, "and production is sufficient for all present needs."

Governor Hardwick, of Georgia, pledged "full, prompt and wholehearted support."

"Only one mine in North Dakota is affected," the message of Governor Nestos, of North Dakota, stated.

Governor Hyde, of Missouri, promised to "take immediate steps to bring about production of coal in this state."

"I am satisfied Utah will be able to handle the situation," Governor Mabey telegraphed.

Governor Dixon, of Montana, wired: "There has been no disorder in Montana and I do not expect any."

Ogle Urges Immediate Selection of Non-Partisan Commission to Investigate Coal Strike

THE next important announcement on the coal situation expected from the White House is that covering the appointment of a coal commission to investigate the present strike and the coal industry in general. Decision of the President to name such a tribunal, notwithstanding failure of his recent mediation offer, was made by Mr. Harding in a letter to Governor Sproul, of Pennsylvania. The Pennsylvania Governor had urged the President to name such a commission.

Whatever opposition the coal operators may have had to an investigating commission in the past quite evidently has disappeared, for on July 23 A. M. Ogle, president of the National Coal Association, representing the producers of bituminous coal, telegraphed President Harding that the operators favored such a course, urged that it be started immediately and made certain suggestions as to its impartial constitution.

Governor Sproul, of Pennsylvania, sent the following telegram to President Harding on Thursday, July 20:

I wish to report strong public sentiment supporting your invitation to operators and miners to resume production. I trust, however, that you are merely withholding the appointment of your commission long enough to determine whether satisfactory production will result. If this does not occur within a reasonable time, I respectfully urge the prompt creation of your commission, either as originally proposed or in modified form. If voluntary production fails, Pennsylvania will welcome exercise by you of full executive authority. Meanwhile I renew my pledge of hearty co-operation.

The President's reply, also dispatched July 20, was as follows:

Your telegram relating to appointment of coal commission, notwithstanding mine workers and a minority of mine operators declined to accept such an arbitration, is received. Matters are temporarily in suspension because when arbitration was denied there was but one consistent thing to do, as I saw it, and that was to invite production. You may expect the selection of a commission, because America's welfare will not permit those who assume to serve it to deny for any reason the supply of such a necessity as fuel and thereby jeopardize American life and health and happiness. Moreover, there was a third party to submit its case to the commission—the great American public. The primary object was the prompt and just ending of a dispute. The broader purpose was a searching inquiry into the coal industry, to learn all the causes of dispute and find a way to avoid them in the future. It may be desirable to modify the form of the commission as originally proposed, because it was first designed to meet most promptly the exigency then existing. I wished a settlement at the conference table, where all could be heard and all be represented on the commission.

It has seemed to me that time to appraise the situation, the opportunity to measure the unquestioned fairness of the proposal and sense the obligations involved, and a period in which to resume production, would either avoid drastic steps on the one hand or clearly justify them on the other. The commission will come in due time. There is an authority above all workers and operators, and that authority—the American public—must have an agency of effective expression

Thank you for your renewed pledge of co-operation, and be assured of like cordial pledges from the executives of most coal-producing states.

Mr. Ogle's telegram, dated at Indianapolis, July 23, was as follows:

In order that there may be no misunderstanding in the minds of the members of your administration or in the minds of the public concerning the attitude of the operators who attended your Washington conference, toward the appointment of a fact-finding tribunal by you, I respectfully and strongly urge upon you the advisability of immediately selecting the men who you desire to act, so that the tribunal can proceed at once to investigate the questions at issue between the miners and operators in the union fields. As we have pointed out before, we strongly feel that this tribunal should be non-partisan—without either miners or operators being included in its membership.

If it is felt advisable by you to have technical advice for the benefit of the tribunal, I might suggest that one operator could be selected by the operators and one miner by the miners to sit with your tribunal in a purely advisory capacity, but without voice or vote. I feel and I know that a large majority, if not all, of the union bituminous operators feel that such a tribunal selected by you if immediately appointed could within a comparatively short time develop outstanding essential facts in regard to the situation.

With such facts before it, the tribunal would be able to give information to the public and to you that would strengthen your hand in carrying out your program to start the mines in accordance with your proclamation to the governors of the several states involved, on a basis of wages which inevitably must mean liquidation of costs and prices to meet the demands and requirements of the public and industry.

We also have in mind that a thorough investigation of all the facts relating to the union bituminous coal fields will be extremely helpful to the American public and to the coal industry as well and should lead to some constructive suggestions.

You may be assured that in the meantime the operators of Indiana are earnestly working with Governor McCray and the local authorities to determine the best and most effective plan under which production of coal can be resumed and I am informed that the operators in all other states are working to the same end. All operators in all districts, union and non-union, unite in supporting you in your determination to protect every man in his inalienable right to work.

Operators of Southwest Reiterate Readiness To Negotiate New Wage Scale

THE Southwestern Interstate Coal Operators' Association has addressed a letter to John L. Lewis and to George L. Peck, John Wilkinson and Arch Helm, district presidents of the union, asking for a joint conference. The letter, dated July 22, 1922, and signed by H. N. Taylor, president of the association, follows:

In view of the developments and final results of the Presidential conference at Washington and its failure to secure some method of procedure in the matter of negotiations of a wage scale for the West and Southwest, we wish to remind you that the Southwestern Interstate Coal Operators' Association, the Oklahoma Coal Operators' Association and the Iowa Coal Operators' Association, comprising the Trans-Mississippi Association, have each complied with the contract requirements in the matter of making every effort possible for the negotiation of a wage scale to succeed the scale expiring April 1, 1922.

The Southwestern Interstate Coal Operators' Association met your representatives in interstate conference March 29 and again on April 10 and were advised of the unwillingness of your representatives to negotiate a wage scale for the Southwestern states, and while the interstate conference was duly organized and is now in adjournment, subject to the call of the chairman and secretary, four different efforts have been made by telegram and letter to secure a reconvening of said conference for the purpose of finishing a wage scale based upon the physical conditions of mining in the Southwest and the economic and competitive conditions of surrounding states.

We believe that had the Mine Workers seconded the efforts of the operators to make a wage scale for the Southwestern district, the same could have been done and the Southwest would have been spared this long cessation of work, now entering its seventeenth week, but each and all of the efforts put forth by the operators for the convening of the wage conference have been persistently and steadfastly declined by officers of the Mine Workers.

The attitude of the members of the Southwestern Interstate Coal Operators' Association is not antagonistic to the United Mine Workers, nor to the principles of collective bargaining, but they feel that their efforts have been ignored by the officers of the United Mine Workers, contrary to the interests of the public, the operators and the mine workers themselves, all of whom have been called upon to bear the brunt and loss and suffering due to what appears now to be certain political animosities and manipulations that have influenced the United Mine Workers organization.

We are now confronted by circumstances and conditions no longer within the control of operators and miners, but have been commanded by our national government, through direction of the President, to resume operation of mines. As loyal citizens of our government it is the purpose of our association members to make every effort possible to make fitting and proper response to the call of the President in the production of coal to meet the needs of the nation and as far as possible prevent suffering and loss to the people during the coming winter.

The Southwestern Interstate joint conference of operators and miners is still organized and in session under adjournment. We have repeatedly proposed negotiations of wage scale for the Southwest, which has been persistently and steadfastly declined and we feel justified in assuming that unless we hear from you to the contrary it is your intention to further decline the reconvening of the Southwestern interstate joint conference for the negotiation of a wage scale, and if this is so is it your desire that said conference be adjourned *sine die?*

Farrington and Lewis Come to Parting of Ways; Separate Settlement Seen

ST. LOUIS, MO., July 25—Frank Farrington, Illinois mine union president, has called a meeting of his executive committee to confer with operators in this city on Wednesday, July 26. It is rumored here that the oft-reported break with John L. Lewis has taken place and that Farrington will arrange a separate settlement with operators in the Illinois field.

The Illinois operators' scale committee was in session in Chicago all day Monday. Rice Miller, president of the Illinois Operators' Association, said after the meeting that he saw no ray of hope for an early resumption. Farrington was in Chicago all day Monday but declined to make a statement.

Government to Control Prices and Regulate Distribution of Coal; Priorities Ordered

By Paul Wooton
Washington Correspondent of *Coal Age*

Washington, D. C., July 25.—A plan for the settlement of the coal strike in the soft-coal mines providing for the guarantee of a minimum wage to mine labor with a minimum of 280 days work per year has been offered to the miners and operators, it was stated by officials at the White House today.

It was not announced whether the miners or the operators had been given opportunity as yet to consider the plan and official announcement is withheld until both parties have been approached as to its workability. It will be recalled that a minimum wage guarantee was one of the suggestions made by John L. Lewis last autumn as a solution of the union miners' troubles.

Senator Borah, chairman of the Senate Committee on Labor, today introduced a resolution calling for a commission to be appointed to inquire into and make report to the Congress on the advisability of nationalizing the coal industry.

The Interstate Commerce Commission this afternoon issued two priority orders affecting coal, both part of the program of the government to control distribution. One provides that priority be given coal in the distribution and loading of open-top cars and the other provides that in the movement of freight coal must be given preference and be shipped by the most direct route to its destination. Both orders follow the style of those of 1920 and are numbered consecutively with those of that year.

Extracts from Service Order No. 23, effective July 26, follow: "That in the supply of cars to mines upon the lines of any coal-loading carrier, such carrier is hereby authorized and directed to place, furnish and assign such coal mines with cars suitable for the loading and transportation of coal in succession as may be required for the following classes of purposes and in following order of classes, namely: Class 1—For such special purposes as may from time to time be specially designated by the commission or its agent therefor, and subject thereto. Class 2—(a) For fuel for railroads and other common carriers, and for bunkering ships and vessels; (b) for public utilities which directly serve the general public under a franchise therefor, with street and interurban railways, electric power and light, gas, water and sewer works, ice plants which directly serve the public generally with ice, or supply refrigeration for human foodstuffs, hospitals; (c) for the United States, State, County or Municipal Governments and for their hospitals, schools, and for their other public institutions, all to the end that such common carriers, public utilities, quasi-public utilities and governments may be kept supplied with coal for current use for such purposes, but not for storage, exchange, or sale.

"Class 3—As to each coal-loading carrier which reaches mines in Pennsylvania, Ohio, West Virginia, Kentucky, Tennessee and Alabama for bituminous coal consigned to any Lake Erie port for transshipment by water to ports upon Lake Superior and subject thereto. Class 4—As to all such carriers by railroad, commercial sizes of coal for domestic use and subject thereto. Class 5—Other purposes. No coal embraced in classes 1, 2, 3 or 4 shall be subject to reconsignment or diversion except for some purpose in the same class or a superior class in the order priority herein prescribed."

DISTRIBUTION and rationing of the available coal supply by the government under the direction of Secretary Hoover and the Interstate Commerce Commission, along with plans to prevent profiteering by withholding cars from mines which charge exorbitant prices, having been declared legal by Attorney General Daugherty on Monday, July 24, the plan will be put into effect within a few days.

The plan tentatively drawn up follows:

(1) A committee in Washington, to be appointed by the President, of representatives of the Department of Commerce, the Interstate Commerce Commission, the Department of Justice, and the Department of the Interior, to be designated the Presidential Committee. This committee to have general supervision of the measures to be taken hereunder and to authorize the execution of such of these measures as may be necessary from time to time.

(2) The Administrative Committee, comprising representatives of the Presidential Committee together with representatives of operators, representatives of the railways, and, where necessary, representatives of the larger consuming groups.

(3) The Presidential Committee will establish a representative in each coal-producing district.

(4) The Presidential Committee will appoint a committee of operators in each district to be nominated by the district operators' association or independent operators (in case of failure of the operators to take such action the Presidential Committee may appoint such operators as they see fit on such committee). The members of these district committees may be changed as determined upon by the Presidential Committee.

(5) The Presidential Committee will co-operate with the Interstate Commerce Commission in carrying out preferential orders issued by the Commission.

(6) The governmental representatives in the districts with the co-operation of the district committees shall advise the agencies of the Interstate Commerce Commission as to local car movement to effect the purposes of this plan.

(7) The operators will proceed with their usual business until they are affected by preference orders.

(8) It is expected that the district committees under authority of the Presidential Committee will recommend the allotment of cars on the basis of those who conform to the fair prices to be agreed upon with the Presidential Committee.

(9) When the operators demand, then suitable guarantees shall be given for payment by persons buying under priority orders.

(10) The railroads will be requested to appoint a representative to deal with purchases of railway fuel.

(11) The basis of prices agreed upon between the operators and the Secretary of Commerce on June 1 are to be maintained except where varied by the Presidential Committee, and this same basis of price determination shall be applied to all districts whic are so far not co-operating.

The whole of the above is tentative, pending further consideration by the Interstate Commerce Commission, the Department of Justice, Department of Interior, and the Department of Commerce.

After agreeing to the government's tentative plan the representatives of the operators returned on Tuesday to their districts, where an effort will be made to obtain its endorsement by a majority of the operators of the districts. If a majority cannot be obtained a committee for the district will be appointed by the President's committee. The plan will apply to all districts where a consequential amount of coal is being produced and will include anthracite, if any production is obtained.

Secretary Hoover stated on Tuesday that the Attorney General is positive that it is entirely legal to give preference in the matter of car supply to those who treat the public right. No one intent on robbing the public can get a car, Mr. Hoover declares. He emphasized the point that a group of operators in the center of the western Kentucky field are adhering to the maximum price of $3.50, despite the fact that some of their fellow operators sold coal on Monday as high as $13.

Secretary Hoover pointed out that no money is available for the organization which the government has set up. He intimated that legislation may be required to furnish the necessary appropriation. He called attention to the fact that the priority plan would displace contracts.

C. E. Bockus was elected chairman of the operators' committee. The Department of Justice was represented at the conferences held at the Department of Commerce. Secretary Hoover presided. Commissioner Aitchison, of the Interstate Commerce Commission, and the Director General of Railroads Davis were parties to the conferences, as were officials of the American Railway Association. George Otis Smith, director of the Geological Survey, and A. H. Holbrook, acting director of the Bureau of Mines, also participated in the conferences.

Whether or not the administration asks it, there is certain to be an effort, before this session of Congress closes, to put through fact-finding legislation and possibly legisla-

tion giving the President special powers to be exercised in case of an emergency.

A question just now receiving the attention of administration officials is just how far the responsibility of the federal government goes in rationing coal. Some are of the opinion that when the needs of the domestic consumer, of the railroads, of the public utilities and of certain food industries are met there should be no further effort to apportion any remainder among other users, on the basis of their essentiality.

While regret is expressed that the President called the operators and miners together at the time he did, and that after getting them together he failed to outline definitely just what would be covered by his proposed arbitration, there is general support for his conduct of the situation since the first conference deadlock. Frequent claims were made during the conferences by some of the operators that the strike was about to begin to disintegrate when the federal government interfered, thereby giving the strikers encouragement. Some operators said they were just on the point of producing coal when the conference was called. Nearly all of them contended that protection was all that was needed to start up their mines. Since arbitration had been declined it is believed by many that the President was justified in sending the operators home to give them an opportunity to make good their claims that they could produce enough coal to meet the situation.

It is admitted that the chances were much against the operators being able to produce enough coal in union territory to tide over the situation even if there had been no railroad strike. Some contend that the time was too precious to gamble any of it on such a hopeless plan. The tightening up of the rail strike dissipated any such chance as may have existed and incidentally gives the operators a good excuse for not trying to carry out the hazardous plan to which they were committed.

The responses from the state governors are not encouraging. They show that public sentiment is with the President but they give little indication that coal will be produced. The most encouraging reply was from the Governor of Michigan, who tried moral suasion, only to be told that the mines could not be opened without the consent of John L. Lewis. The only alternative is to take over the mines, so the Governor telegraphed the President asking his advice as to how this could be done. The latest advices indicate that the mines cannot be taken over until after the Legislature has been called into session. In addition, it would be necessary to have appropriations to furnish operating capital. If the Michigan mines were taken over the principal value of the move would be in the establishment of a precedent, since the state produces only 6 per cent of the bituminous coal it consumes.

Governor Sproul, of Pennsylvania, acted promptly and sent troops but he emphasized the necessity for keeping the arbitration proposal alive.

The responses from the governors indicate clearly that the strike cannot be settled by force. Even were the federal government to comply with the request of the Governor of Iowa that troops be sent to protect the state's mines, it would be a dangerous thing to do, all admit. Indiscretion on the part of an irrresponsible federal soldier might precipitate a grave crisis.

Talk of taking over mines by the federal government has almost died out during the last few days. The realization that all the larger mines would have to be operated, if a supply of coal sufficient for the country's needs were to be produced, brought up a train of problems in addition to that of policing the vicinity of those mines. If the government were to furnish the working capital, arrangements would have to be made for the use of several hundred millions of dollars and the setting up of a gigantic business operation. The only other way to handle such a situation would be to co-operate with the mine owners and use their capital. Many objections to such intimate co-operation with one of the parties to the strike can be foreseen. Even the matter of protecting properties presents unusual difficulties in such fields as those of Illinois and Indiana, where there are no housing facilities at the mines. Before the federal government could even start to seize a mining property it probably would be necessary to declare martial law.

Production has been reduced to the point where the situation is hurrying to its climax. The one thing which might precipitate a settlement, and it is admitted that it is only the barest sort of possibility, is a separate peace in Illinois.

Even if there were no railroad strike, transportation troubles of a serious character would be certain to ensue in an effort to supply the territory north of the Potomac and Ohio rivers, which consumes 80 per cent of the coal output, from mines south of that line.

Bituminous coal must be mined at the rate of 12,000,000 tons a week for the next six months if all requirements of the country are met. It is evident, even if the effects of the shopmen's strike are overcome, that no such production can come from the non-union fields and from the weaker outlying union districts. The operators' pre-strike estimate of 6,000,000 tons of production from non-union territory has not been approximated, when one considers the average production during the sixteen weeks that the strike has lasted. The highest production obtained in a single week since the strike began was 5,360,000 tons, during the twelfth week. Production now has fallen to the point where it promises not to exceed 3,600,000 tons this week.

Defer Assigned-Car Hearing Till Aug. 14; Gutheim and McAuliffe Testify

TO CONFORM with the desires of both the carriers and the operators of coal mines, the Interstate Commerce Commission has postponed further hearings in the assigned-car case until Aug. 14. This action was taken at the completion of the testimony of A. G. Gutheim, principal witness for the carriers.

Mr. Gutheim presented an imposing array of facts and figures intended to prove that assigned cars are essential to a regular and adequate supply of railroad fuel. He admitted that there is a human element to consider in the situation which does result in some misinterpretation of the rules and in some inequality of treatment, but be contended that the disadvantages are far outweighted by the advantages of the system.

Eugene McAuliffe testified briefly. He opposed any use of assigned cars or of private cars. He said cars should be distributed according to the ability of each mine to load. He took issue with the argument that assigned cars are necessary to keep the railroads properly supplied with coal.

Upper Potomac Operators Deny Car Shortage; Intimidation Hampers Operation

SHARP issue is taken by operators of the Upper Potomac field with the statement of Governor Ritchie, of Maryland, to the President in which he said: "The Upper Potomac mining district continues partial operations but is handicapped by the railroad strike, which prevents coal being shipped from the mines."

"Governor Ritchie's wire to President Harding regarding Upper Potomac district being handicapped by railroad strike incorrect," John F. Palmer, secretary of the Upper Potomac Coal Operators' Association, says. "No car shortage in this district since the strike began. Five hundred surplus cars available today, also sufficient motive power."

To this Secretary Palmer has added the statement that "There never has been a car shortage in the Upper Potomac field since the strike began. It is not a question of car shortage but a question of intimidation of striking miners against men who want to work." There is a surplus of cars on the Western Maryland R.R.

Operators in the Georges Creek field, having had no protection against intimidation and violence, have engaged in no general effort to get back to a normal basis nor do they intend to do so in the absence of military protection, no matter what may happen, it is said.

Sixteenth Week of the Coal Strike

EDITORIAL REVIEW

FOLLOWING the break-up of the peace moves of President Harding in the coal strike when on Monday, July 17, the announcement was made that the miners and a portion of the soft-coal operators had rejected the plan of Mr. Harding to put the mines back at work, there have been no important developments in the situation. On Tuesday the President sent a call to the governors of 28 coal-producing states asking that they give protection to such men as volunteered to return to work in the mines under the invitation that he had extended to the operators to "return home and open the mines." So far no mines are reported to have been opened under this program and as the days pass there is less likelihood of any important increment to production by this route. The hard-coal producers are not disposed to hazard their valuable top works in an effort to get out coal even if sufficient men could be induced to enter the mines. The Pittsburgh operators are said to be actively seeking to open a few mines and in the newly created "open-shop" areas, as Kanawha, progress would be more rapid than it is were it not for transportation disability on certain roads.

An investigation is being made by Attorney General Daugherty to determine whether the rail and coal strikes are sympathetic strikes. "There appears to be a relationship between the rail and coal strikes, but whether it is conspired or inspired I cannot say," said Mr. Daugherty.

C. J. Albasin, Commissioner for the Pittsburgh Vein Operators Association of Ohio, states that eastern Ohio operators intend to obey the mandate of the government to resume mining operations, but he qualifies this statement by adding that the policy of the eastern Ohio operators has not yet been definitely fixed.

Mr. Frank Ledvinka, president of the miners' district for eastern Ohio, at the same time stated that if any attempt were made to reopen the mines before a settlement is made he would call out the union pumpers and maintenance men who have been working since the strike began.

Two developments of the week served to stiffen the morale of the strikers in the non-union fields of Central Pennsylvania. The first was the rejection of President Harding's arbitration proposal by the mine workers because all operators in the county were not brought within its jurisdiction, after the strikers here had about reconciled themselves to be left "holding the bag" after the union miners and operators got together. The second was the calling out of the guardsmen. While that was done by the Governor to prevent any disorders it will be impossible to convince the strikers it is said that the soldiers were not brought into the coal fields in an effort to force them to go back to work.

As a possible solution to the coal difficulties Senator King, of Utah, on Friday, July 21, introduced a resolution in the Senate proposing the appointment of a commission of five members by the President to investigate the strike and related problems in the coal industry with a view to their solution. The Senator does not specify the manner in which the commission shall be appointed, leaving it to the discretion of the President.

At Hampton Roads the situation has shown little improvement over a week ago. Shippers who had steamers under charter have many of them exercised their option of cancelling, receipts of coal at the piers having become so undependable. The output of the smokeless fields has been very much affected, and since these districts were caring for the Eastern situation measurably well until July 4 buyers are quite apprehensive. A few interests have been offering spot coal at increasingly high prices, the Hoover level having been left far behind, once demand tended to exceed supply. Something of a fleet has accumulated at Hampton Roads, where a few weeks ago the accumulation was one of coal rather than of ships. Prices as high as $7.50 and $7.75 f. o. b. vessel at Norfolk are said to have been realized within a few days.

Sproul Calls Troops to Maintain Order In Pennsylvania Bituminous Region

GOVERNOR SPROUL, of Pennsylvania, signed an order July 20 detailing the 104th Cavalry, 52d Machine Gun Squadron and Motor Transport Co. 110, of the National Guard, to active service in the bituminous coal region of the state. The troops 1,110 in number, entrained July 20 for service at strategic points in Washington, Westmoreland, Cambria, Indiana and Somerset Counties, under command of Colonel E. J. Stackpole, Jr., of Harrisburg, commander of the 104th Cavalry. A proclamation was issued by the Governor calling upon the constituted authorities and the citizens to aid in seeing that order is kept.

Coal and Coke Production Suffers Slight Setback in Connellsville Region

DURING the last week there was a slight falling off in the production of coal and coke in the Connellsville coke region, due to the action of the government in the coal strike and the condition of the Baltimore & Ohio R.R. brought about by the railroad strike, cars being scarce.

The following companies are operating, mostly on a considerably reduced output: Pittsburgh Steel Co., at about 10 per cent of normal; W. J. Rainey, Inc., about 10 per cent; American Coke Corporation, about 5 per cent; H. C. Frick Coke Co., about 60 per cent; Reliance Coal & Coke Co., about 20 per cent, Consolidated Coke Co., Connellsville Central Coke Co., Hoover Coal & Coke Co. and Republic Iron & Steel Co. each at about 10 per cent; Poland Coal Co. and Redstone Coal & Coke Co., about 15 per cent each; American Manganese Co., about 50 per cent; Mather Collieries Co. and Crucible Fuel Co., about 30 per cent; Buckeye Coal Co. and Forsythe Coal Co., about 25 per cent; Locust Hill Coal Co., about 50 per cent; Fancy Hill Coal Co., about 50 per cent; Walnut Hill Coal Co., about 50 per cent; Penn-Pitt Coal Co., about 25 per cent; Westmoreland-Fayette Coal & Coke Co., West Point Marion Coal Co., Atlantic Coal Co., Harrah Coal Co., Rich Hill Coal Co., Southern Connellsville Coke Co., W. J. Parshall and McIntyre Coal Co., about 75 per cent; Diamond Coal & Coke Co., Hillman Coal & Coke Co., Franklin Coke Co. and Forsythe Coal Co.

The following companies are idle, not trying to operate: Brier Hill Coke Co., Century Coke Co., Snowden Coke Co., Shamany Coal Co., Champion Gas Coal Co., Waltersburg Coke Co., Stern Coal & Coke Co., Republic Coal & Coke Co., Etna-Connellsville Coke Co., Union Connellsville Coke Co., Eastern Coke Co., McKeefry Coal Co., Husted-Seamans Coal & Coke Co., Atlas Coke Co., Superior Coal Co., Rosedale Coal Co., La Belle Coke Co., Lincoln Coal & Coke Co., Puritan Coke Co., Bourne-Fuller Coke Co., Fayette Coke Co., Washington Coal & Coke Co. and Oliver & Snyder Steel Co.

Midwest Region Seeks Ways of Getting Back to Work; Michigan is About Ready

COAL-MINING states of the Middle West are trying their level best to accept President Harding's "invitation" to return to work and get out the coal the country needs. Michigan thinks it will soon be producing—at least for state and municipal use. Indiana and Illinois are hamstrung by the statutes on the books of each state which, in effect, prevent the mining of coal by non-union men. The question is can the two states shake themselves free from those statutes? In Indiana Governor McCray is making a try at a state settlement of the coal strike before action centers against the statute. He invited operators and mine leaders to confer with him in Indianapolis Tuesday, July 25, with the hope of getting somewhere.

In Illinois Lieutenant Governor Sterling, in the absence of Governor Len Small, is doing some talking, but little else.

He announced he had asked Frank Farrington, president of the state miners' organization, to meet him. Mr. Farrington denies any such invitation, though he declares he would do anything he legitimately could to aid the Lieutenant Governor in any plan he might have to end the strike.

Business organizations of Illinois are loudly urging that a special session of the Legislature be called at once to repeal the miner's qualifications act and that thereafter the operators open the mines with non-union labor under state protection. Letters asking for a special session have been sent by the Illinois Manufacturers' Association and the Illinois Chamber of Commerce. They also suggest that the special session take up the question of establishing a state constabulary. The Chamber of Commerce, in its letter to Governor Small, requests him to demand that President Farrington and the operators get together within 48 hours, to submit the strike questions to arbitration if they cannot settle them themselves, and to resume mining not later than Aug. 1 on some sort of temporary basis if no permanent one has been worked out by that time.

Michigan proposes to go ahead in spite of the solemn utterances of John L. Lewis, International mine union president, that miners there will not go back to work unless the state gets the permission of the union. Governor A. J. Groesbeck, having received no assurance from Washington that federal power will support him in a plan to seize the mines, has appealed to the miners to mine coal for public institutions if for nobody else. He gave them until Monday night the 24th to answer, implying in his message that the state would act if they did not.

Coal Shortage Begins to Strike Home In Northwest and Middle Regions

AT LAST the home folks are beginning to feel the pinch of the coal shortage throughout the territory west of Indiana. Heretofore the strike's effect has been felt principally by railroads and large industrial consumers. But with transportation lines sagging—partly for lack of fuel—with electric light and water and gas plants all publicly figuring on the number of days they can run before shutting off service and with retail dealers turning away the first waves of people who want to buy their winter's coal at once, the cold facts of the strike are sinking home.

In Missouri there is considerable quaking on the part of the public. St. Louis public institutions are within a few days of the end of their coal supplies. The Governor of Missouri is contemplating a coal apportionment board for the state and the Mayor of St. Louis is planning the same service for the city. Throughout Illinois many a small public-utility plant is preparing to fall back on the large public-service companies. Railroads are cutting off more and more trains—because of coal shortage primarily, the officials assert—and boat lines on the Lakes, notably that operated by the Buffalo Steamship Co., have reduced schedules, thus cutting down the flow of shipping. Public institutions in Chicago, however, are supplied for at least 45 days and many of them longer.

Senator King Preparing Bills to Settle Strike; Mediation Commission Proposed

SENATOR KING, of Utah, who was one of the Senators who conferred on the coal strike recently with Samuel Gompers, head of the American Federation of Labor, is preparing to introduce before the end of the month, unless the coal strike is ended, bills designed to meet the situation. One proposes an investigation of all the phases of the strike with a view of determining which side to the controversy is at fault, and to expose it to the public with a view of bringing such public pressure as to force yielding on their part, which would operate to settle the issue. Another bill in preparation proposes that a commission shall be appointed by the President to adjudicate the controversy.

In connection with the strike it is said that the Shipping Board can operate vessels sufficient to import from foreign countries as much as 500,000 tons of coal a month if importation of coal has to be resorted to.

U. S. Commerce Chamber Members Asked To Support Harding Resumption Plan

JULIUS H. BARNES, president of the Chamber of Commerce of the United States, in a letter of July 20 called upon all members of the organization to take active steps in support of the program which President Harding has urged upon the governors of the coal-producing states.

Efforts at national arbitration in accordance with the proposal of the President having failed, Mr. Barnes points out that not only must law and order and the right of every man to work where he pleases without molestation be maintained by states and local authorities, backed up by the federal government, but that the settlement of the underlying controversy over wages and working conditions is now in the hands of governors and state authorities. Such settlements are imperative, he declares, if the country is not to experience suffering for lack of fuel when the cold weather sets in and industries are not to close down, thereby creating widespread unemployment.

Campaign of Frightfulness Unearthed Following Killing of Sheriff Duvall

SIMULTANEOUSLY with the news of the trouble near Wellsburg, W. Va., when early in the morning of July 17 a mob of striking miners from Avella, Pa., attacked the Cliftonville mine of the Richland Coal Co., in Brooke County, and killed Sheriff H. H. Duvall, announcement was made by West Virginia state officials that they had discovered and were investigating a statewide campaign of frightfulness planned by a secret organization, the dynamiting of a train of miners in Boone County being regarded as the first evidence of this plot. Under radical leadership and incendiary speeches, striking miners are being urged to tear down the flag and take the law into their own hands and the situation in West Virginia is a serious one.

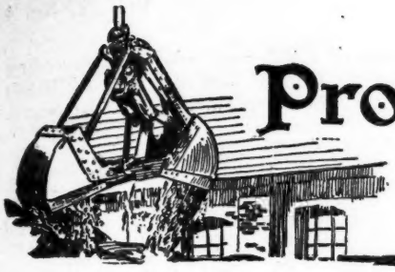
Companies That Suffered in Herrin Riot File Suits Against Williamson County

THE two companies principally involved in the June 22 massacre of non-union men working at the Southern Illinois Coal Co.'s strip mine near Herrin, Ill., have filed suits against Williamson County to recover $217,000 for property damaged by the uncontrolled mobs of attackers. The Southern Illinois Coal Co. asks $200,000 and the Hamilton Lester Coal Co. $17,000 for its steam shovels blown up during the attack. None of the families of the 19 men killed by the mob has filed suit against the county. Under the law, as interpreted by an attorney for the coal companies, each family can recover up to $5,000.

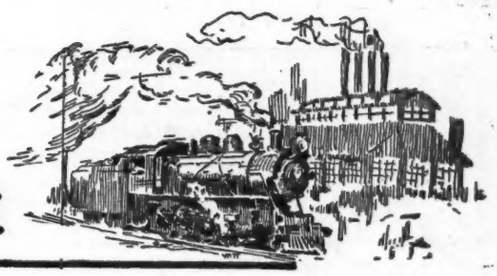
Utah is Calm; National Guardsmen Stay On the Job; More Men Digging Coal Now

THINGS are very quiet in the Utah strike area, but nothing has been said so far in official circles about recalling the National Guard. Most of the strikers have been disarmed now, it is believed, and it would seem that the danger of the conflagration feared a short time ago has passed. More men are being taken on at the mines, but so far no concerted effort has been made to break up the strike, and the miners' leaders profess to be confident of victory.

ANNOUNCEMENT WAS MADE by the Pennsylvania Coal & Coke Corporation, with headquarters at Cresson, Pa., upon the return of the president, T. W. Watkins, that it has accepted the proposal of President Harding of July 10 for the resumption of operations at its mines, which are located in various parts of Cambria County. Mr. Watkins has been the representative of the Central Coal Association in the negotiations at Washington and as the association has been against the acceptance of the proposal, Mr. Watkins has withdrawn as the association's representative.



Production and the Market



Weekly Review

WITH a speed that takes away the breath, coal prices last week soared to levels no one ever expected to see again after the orgy of 1920. Consumer demand is now centered on a very small tonnage, for of the coal that is getting over the strike paralyzed rails a large portion is going on short and to a lesser extent long term contracts. The majority of the spot coal reaching the market is priced at the level pegged by Secretary Hoover in June and it is a smaller portion that is rising to the bait of the long green held alluringly before the eyes of the operators by the hungry buyer.

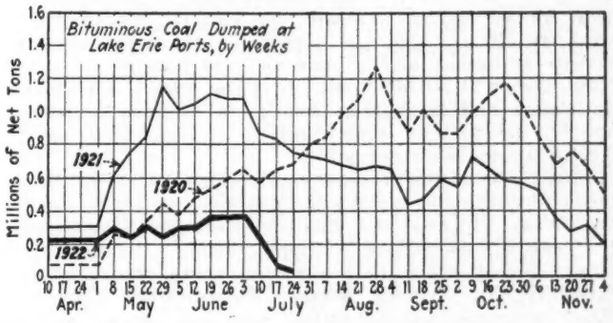
Coal Age index of mine prices of bituminous coal rose sharply to 460 on Monday, July 24, a gain of 139 points in a week. The average spot price corresponding was $5.57, compared with $3.89 a week previously. Western Kentucky, a district that did not enter into a price agreement with Mr. Hoover, led the procession, prices for that coal reaching $11.50 on Saturday, July 22, after a series of sensational jumps averaging a dollar a day for a week. Eastern coals were but little laggard, high volatile registering $11 on Monday, July 24.

British Coal Bought Heavily for Import

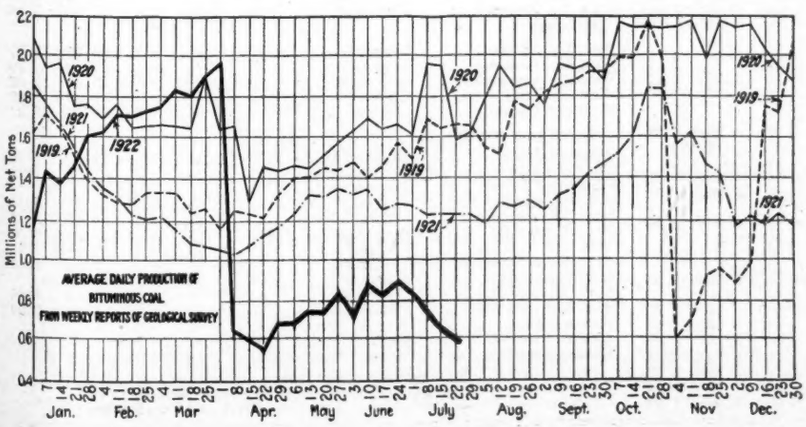
The feature of the week was the wholesale purchase of British coals for importation. Not that the price on this side has been a bar to imports for some time past but that opinion suddenly crystalized in the belief that the strike had yet a long course to run and that the reserves in this country are so low that several months must elapse before demand dies down, prompted this stampede to the British Isles. Within a week after the run began not less than 500,000 gross tons of English coal had been bought and ships chartered. In fact it is lack of ships that has halted the movement. A short time only will be required, however, to condition and get into English ports all the ships that are required to carry over the coal that can expeditiously be unloaded on this side. Railroads, public utilities, industrials, jobbers and even steamship companies are now in the game, which promises for the free lance all the excitement, profits, and chances of loss eventually found in the export game in 1920.

Production of bituminous coal lags with the blighting effect of the rail strike, which, according to John Lewis, has quite by coincidence been most effective on those roads serving the non-union coal fields which have been the mainstay of the country's coal supply so far throughout the coal strike.

To make as effective as possible what little coal is trickling through the rail strike lines and to hold down the price, the government at Washington is working



out a scheme of rationing and price control that is planned to go into effect this week. The railroads and utilities are to be the first to get coal with certain other essentials. Beyond that the coal will not go far for the needs of some of these are becoming increasingly urgent. At the present rate there will be a sorry looking coal pile in Uncle Sam's back yard on Sept. 1. Coal shortages in the past in this country have been more or less myths existing in the minds of consumers,

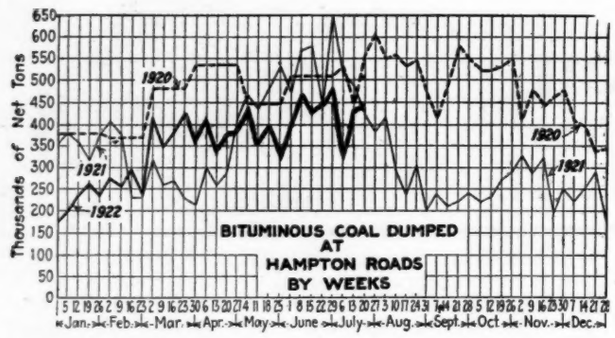

Millions of Net Tons
1920
1921
1919
1922
AVERAGE DAILY PRODUCTION OF BITUMINOUS COAL FROM WEEKLY REPORTS OF GEOLOGICAL SURVEY
Jan. Feb. Mar Apr. May June July Aug. Sept. Oct. Nov Dec.

Estimates of Production

(Net Tons)

	1921	1922
BITUMINOUS		
Week ended:		
July 1 (*b*)	7,658,000	5,226,000
July 8 (*b*)	6,165,000	3,678,000
July 15 (*a*)	7,401,000	4,114,000
Daily average	1,234,000	686,000
Calendar year	210,030,000	195,644,000
Daily average calendar yr	1,279,000	1,182,000
ANTHRACITE		
July 1 (*b*)	1,868,000	25,000
July 8 (*b*)	1,525,000	23,000
July 15 (*a*)	1,876,000	31,000
COKE		
July 8 (*b*)	34,000	94,000
July 15 (*a*)	44,000	98,000
Calendar year	3,476,000	3,408,000

(*a*) Subject to revision. (*b*) Revised from last report.



but this time, unless the miners get to work very, very soon, the absence will be real. A shivering lot of citizens will be hovering around the gas range or warming their toes by some neighbor's fireside this fall. The coal industry will come in for a lot of verbal fixing by these same citizens.

BITUMINOUS

Traffic congestion on the railroads has so interfered with the movement of freight that the production of the non-union coal fields has been and still is shrinking. Preliminary reports to the Geological Survey for the week of July 19-22 indicate a new low record of around 3,600,000 tons, as compared with the maximum in the twelfth week of the strike of 5,363,000 tons. The Survey notes that "In comparison with normal years the present deficit in production is even more marked. Final returns on the fifteenth week of the strike (July 10-15) show 4,114,000 tons of bituminous coal and 31,000 tons of anthracite, a total for all coal of 4,145,000 tons. In the corresponding week of 1921, a year of depression, the total quantity raised—anthracite and bituminous—was 9,280,000 tons; in 1920 it was 11,500,000 tons. In other words, considering anthracite and bituminous coal as a common source of supply, the present weekly output is from 5,000,000 to 6,000,000 tons below normal.

"The cause of the decrease was unmistakably traffic congestion on railroads serving the non-union fields. In Southern West Virginia and Eastern Kentucky from which the bulk of the country's supply during the strike has come, almost every field reported acute transportation disability. In Virginia, Western Kentucky and Tennessee the interruption of car supply was less serious and in Alabama and the Far West it increased.

"The trend of production is shown by the following table of cars loaded daily. On Monday railroads reported loading 12,657 cars, a decrease of 2,437 cars below the preceding Monday. By Thursday loadings had dropped to 10,800 cars, the lowest on any Thursday since the strike began.

	1st Week	11th Week	12th Week	13th Week	14th Week	15th Week	16th Week
Monday	11,445	15,474	15,311	16,747	11,039	15,094	12,657
Tuesday	11,019	15,849	16,622	15,748	334	12,909	10,915
Wednesday	11,437	14,905	17,032	15,656	11,979	12,398	10,895
Thursday	1,090	14,884	16,432	16,402	14,521	11,593	10,800
Friday	11,296	13,933	16,073	15,980	14,631	11,606	.....
Saturday	8,888	13,465	13,993	12,603	12,523	9,694	.....

"The reports so far received indicate no significant change in the number of men at work. Production in non-union Pennsylvania during the first half of the present week showed a slight decrease from the week preceding."

Some impatience is being shown in official circles in Washington by the action of New England and the Northwest in again demanding preferential treatment in the matter of coal supply. Until very recently, coal went begging at the Lower Lake ports and some 300,000 tons recently had to be shipped back from Upper Lake docks to other buyers because the Northwest would not pay the price asked.

New England uses less coal than the Chicago industrial area, yet its demands are heard above those of all other sections. New England, sooner or later, will have to put up with the inconvenience of burning bituminous coal, one official said. He thinks it would be better for New England to burn a much larger proportion of soft coal this winter and send such reduced amounts of anthracite as may be available into sections which had not such a favorable opportunity of securing bituminous coal.

Lake dumping dropped last week to 138,438 tons, of which 15,638 tons were vessel fuel and 122,800 tons were cargo coal. This compared with 170,000 tons the week previous, 236,000 tons the week before and 370,000 tons the week ended July 2, indicates the rate at which the Lake movement is slumping. Vessel fuel is so scarce and so high-priced that boats in the ore trade are being threatened with a tie-up and passenger boat schedules are already cut. Of the slightly more than 4,000,000 tons of Lake cargo coal this year but 80 per cent has gone to normal destinations.

Movement of both hard and soft coal through the New England gateways continues at the low rate of past weeks, averaging around 400 cars of anthracite, nearly all steam sizes, and about 500 cars of bituminous. The flow of soft coal will soon drop even below that figure. The full effect of the shortage in the East will show up as soon as coal en route has passed the gateways.

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F. O. B. Mines

Low-Volatile, Eastern	Market Quoted	June 26 1922	July 10 1922	July 17 1922	July 24 1922†
Smokeless lump	Columbus	$3.65	$3.65	$3.95	**$5.50@$6.50**
Smokeless mine run	Columbus	3.45	3.45	3.75	**5.50@6.50**
Smokeless screenings	Columbus	3.35	3.25	3.45	**5.00@6.00**
Smokeless lump	Chicago	3.65	3.65	4.15	**7.50@9.00**
Smokeless mine run	Chicago	3.40	3.45	4.15	**7.50@9.00**
Smokeless lump	Cincinnati	3.65	3.75	4.40	**3.75@7.00**
Smokeless mine run	Cincinnati	3.45	3.50	3.80	**3.50@7.00**
Smokeless screenings	Cincinnati	3.15	3.25	3.25	**3.25@6.50**
*Smokeless mine run	Boston	6.10	6.35	6.55	**7.50@7.75**
Clearfield mine run	Boston	3.30	3.50	3.40	**3.50@3.75**
Cambria mine run	Boston	3.65	4.00	3.85	**3.75@4.25**
Somerset mine run	Boston	3.40	3.65	3.50	**3.50@4.00**
Pool 9 (Super.Low Vol.)	New York	4.40	4.40	....	.....
Pool 9 (Super.Low Vol.)	Philadelphia	4.30	4.70	4.75	.....
Pool 9 (Super.Low Vol.)	Baltimore	3.75	4.40	4.50	**4.25@5.25**
Pool 10 (H.Gr.Low Vol)	New York	3.95	4.25	4.80	**8.75**
Pool 10 (H.Gr.Low Vol.)	Philadelphia	4.00	4.45	4.55	.....
Pool 10 (H.Gr.Low Vol.)	Baltimore	3.75	4.40	4.50	**4.25@5.25**
Pool 11 (Low Vol.)	New York	3.75	4.05	4.60	**8.00@8.50**
Pool 11 (Low Vol.)	Philadelphia	3.75	4.25	4.40	.....
Pool 11 (Low Vol.)	Baltimore	3.75	3.90	4.30	**4.25@5.25**
High-Volatile, Eastern					
Pool 54-64 (Gas and St.)	New York	3.90	3.90	4.70	**8.50@9.00**
Pool 54-64 (Gas and St.)	Philadelphia	....	3.65	4.40	.....
Pool 54-64 (Gas and St.)	Baltimore	3.75	3.90	4.10	**4.25@5.25**
Kanawha lump	Columbus	3.65	3.65	4.00	**5.50@6.50**
Kanawha mine run	Columbus	3.40	3.40	3.65	**5.25@6.25**
Kanawha screenings	Columbus	3.30	3.15	3.40	**5.25@6.25**
W. Va. Splint lump	Cincinnati	3.50	3.90	4.25	**3.75@6.50**
W. Va. Gas lump	Cincinnati	3.50	3.90	4.25	**3.75@6.50**
W. Va. mine run	Cincinnati	3.40	3.75	4.00	**3.50@7.00**
W. Va. screenings	Cincinnati	$3.15	$3.35	$3.60	**$3.25@$6.25**
Hocking lump	Columbus	3.65	3.65	3.80	**5.25@6.25**
Hocking mine run	Columbus	3.45	3.40	3.70	**5.00@6.00**
Hocking screenings	Columbus	3.45	3.20	3.40	**5.00@6.00**
Pitts. No. 8 lump	Cleveland	3.95	4.25	4.75	**7.00@7.50**
Pitts. No. 8 mine run	Cleveland	3.90	4.00	4.40	**7.00@7.50**
Pitts. No. 8 screenings	Cleveland	3.90	4.00	4.40	**7.00@7.50**
Midwest					
West Ky. lump	Louisville	4.10	4.75	6.15	**10.00@10.50**
West Ky. mine run	Louisville	4.10	4.90	6.15	**10.00@10.50**
West Ky. screenings	Louisville	4.10	4.90	6.15	**10.00@10.50**
West Ky. lump	Chicago	4.20	5.05	6.50	**10.00@12.00**
West Ky. mine run	Chicago	4.20	5.00	6.50	**10.00@12.00**
South and Southwest					
Big Seam lump	Birmingham	2.20	2.35	2.35	**2.30@2.50**
Big Seam mine run	Birmingham	1.95	2.15	2.20	**2.20@2.50**
Big Seam (washed)	Birmingham	1.85	2.40	2.40	**2.50**
S. E. Ky. lump	Chicago	3.65	3.75	4.15	**9.00@9.75**
S. E. Ky. mine run	Chicago	3.40	3.65	4.15	**9.00@9.75**
S. E. Ky. lump	Louisville	3.60	3.90	4.40	**9.00@9.50**
S. E. Ky. mine run	Louisville	3.40	3.70	4.15	**9.00@9.50**
S. E. Ky. screenings	Louisville	3.30	3.50	4.25	**9.00@9.50**
S. E. Ky. lump	Cincinnati	3.75	3.90	4.25	**7.00**
S. E. Ky. mine run	Cincinnati	3.35	3.75	4.00	**3.50@6.50**
S. E. Ky. screenings	Cincinnati	3.15	3.25	3.75	**3.25@6.00**
Kansas lump	Kansas City	5.00	5.00	5.00	5.00
Kansas mine run	Kansas City	4.25	4.25	4.75	4.75
Kansas screenings	Kansas City	3.05	2.80	4.25	4.25

*Gross tons, f. o. b. vessel, Hampton Roads.
†Advances over previous week shown in **heavy type**, declines in *italics*.
NOTE—Smokeless prices now include New River and Pocahontas.

COKE

Production of beehive coke recovered after the July 4 holiday but is still below the rate of output in June. Blast furnaces are depending on byproduct coke coming from supplies of coal mined and stored before the present drop in production.

MONTHLY OUTPUT OF BYPRODUCT AND BEEHIVE COKE IN THE UNITED STATES (a)

(Net Tons)

	Byproduct Coke	Beehive Coke	Total
1917 Monthly average	1,870,000	2,764,000	4,634,000
1918 Monthly average	2,166,000	2,540,000	4,706,000
1919 Monthly average	2,095,000	1,638,000	3,733,000
1920 Monthly average	2,565,000	1,748,000	4,313,000
1921 Monthly average	1,660,000	463,000	2,123,000
March, 1922	2,137,000	732,000	2,869,000
April, 1922	2,208,000	528,000	2,736,000
May, 1922	2,537,000	432,000	2,969,000
June, 1922	2,580,000	458,000	3,038,000

(a) Excludes screenings and breeze.

To make the coke produced, it is estimated, required 4,429,000 tons of coal, of which 3,707,000 tons was used in byproduct ovens and 722,000 tons in beehive ovens. The present monthly rate of consumption of coking coal is thus about 1,300,000 tons above the 1921 average but is still 2,660,000 tons below the average in the year of maximum demand, 1918.

ESTIMATED MONTHLY CONSUMPTION OF COAL FOR MANUFACTURE OF COKE

(Net Tons)

	Consumed in Byproduct Ovens	Consumed in Beehive Ovens	Total Coal Consumed
1917 Monthly average	2,625,000	4,354,000	6,979,000
1918 Monthly average	3,072,000	4,014,000	7,086,000
1919 Monthly average	2,988,000	2,478,000	5,466,000
1920 Monthly average	3,684,000	2,665,000	6,349,000
1921 Monthly average	2,385,000 a	731,000 a	3,116,000
March, 1922	3,071,000 a	1,155,000 a	4,226,000
April, 1922	3,172,000 a	833,000 a	4,005,000
May, 1922	3,645,000 a	681,000 a	4,326,000
June, 1922	3,707,000 a	722,000 a	4,429,000

(a) Assuming a yield in merchantable coke of 69.6 per cent of the coal charged in byproduct ovens and 63.4 per cent in beehive ovens.

Car Loadings and Surpluses

	All Cars	Coal Cars
Cars loaded:		
Week ended July 8	718,319	68,996
Previous week	876,896	94,748
Same week a year ago	640,535	123,970
Surplus cars:		
July 7	239,160	146,743
June 30	239,225	147,558

ANTHRACITE

Dealers in hard coal are rapidly clearing up their yards and in but few is there anything but pea coal. The supply of that unpopular size is dwindling and two companies have withdrawn prices and no longer take orders. When that stage is reached the boards are about bare. Nearly four months of production have been lost with no prospect of mine resumption and no opportunity of making up for lost time, for the hard coal mines are normally run at full capacity for 12 months each year to supply the ordinary demands of the householder. The lack of steam coal will also prove embarrassing in the East.

A new weekly statistical service just inaugurated by the Geological Survey and appended herewith, shows weekly shipments from each of the major producing fields. The figures are based upon reports furnished by the railroads, giving the number of cars loaded for shipment at the mines on each railroad division. These figures of rail shipments are not identical with production, for they do not include water shipments, sales to local trade and mine fuel. Still more important, they do not include coal made into coke, which absorbs a large fraction of the output in the Connellsville district and a smaller fraction in other districts.

The grouping of railroad divisions corresponding with coal-producing districts was done by W. P. Ellis, of the Department of Commerce. The groupings used for the principal fields are shown by the footnotes, which apply to the table.

WEEKLY SHIPMENTS OF BITUMINOUS COAL FROM PRODUCING DISTRICTS, AS REPORTED BY THE RAILROADS

(Net tons, assuming 50 tons to the car)

District	April 8	April 22	May 13	May 27	June 10	June 24	July 1	July 15	Current Week*
Central Pennsylvania a	132,900	94,150	125,900	138,800	150,000	164,700	153,350	139,050	132,000
Western Pa., including Freeport b	118,550	64,800	93,750	113,200	117,250	138,900	123,850	131,550	125,100
Greensburg-Westmoreland c	264,450	161,250	137,800	141,850	157,650	164,850	161,800	181,250	166,900
Connellsville and Somerset-Meyersdale d	289,350	198,400	206,700	233,200	255,700	282,850	274,400	230,150	231,300
South Fork and Windber e	61,050	2,650	7,150	10,150	12,850	17,000	15,800	18,200	17,200
Total Pennsylvania	866,300	521,250	571,300	637,200	693,450	768,300	729,200	700,200	672,500
Georges Creek, Upper Potomac and Cumberland-Piedmont f	18,250	29,300	49,900	61,700	66,750	72,500	77,950	59,500	50,200
West Virginia Panhandle g	29,300	39,700	41,500	40,900	43,750	46,150	48,950	43,250	39,400
Fairmont h	7,150	13,700	26,600	34,600	41,300	50,150	46,850	44,750	46,600
Coal and Coke i	27,850	35,100	41,850	44,100	46,800	50,900	49,900	24,550	29,100
Kanawha and Coal River j	8,100	14,600	27,100	38,950	52,300	58,700	58,500	70,650	66,700
Logan k	297,600	292,400	355,400	382,150	368,000	393,900	380,400	185,150	145,600
New River (C. & O New River Division) l	61,850	61,900	109,400	131,550	158,100	188,550	177,400	175,500	150,500
Winding Gulf (Virginian) m	103,650	103,400	130,950	163,400	166,550	145,150	139,400	134,300	88,400
Pocahontas and Tug River	445,400	478,150	558,250	561,250	550,650	565,000	557,100	350,250	298,300
Kenova Thacker	129,250	146,000	180,450	190,250	199,300	199,900	217,300	161,150	109,500
Total West Virginia and Maryland	1,128,400	1,214,250	1,521,400	1,648,850	1,693,500	1,770,900	1,753,750	1,249,050	1,024,300
Eastern Kentucky n	407,600	540,750	611,250	732,900	755,250	687,400	633,150	315,150	321,600
Western Kentucky o	88,850	143,450	372,250	396,050	419,500	394,600	407,550	357,900	398,600
Tennessee p	28,850	44,350	76,500	68,300	88,600	90,750	85,250	70,450	72,100
Clinch Valley and S. W. Virginia q	132,800	156,250	204,800	215,850	219,500	225,750	220,250	157,450	128,600
Alabama and Georgia	249,450	194,450	232,850	250,450	276,000	299,150	311,850	301,400	299,700
Ohio	34,250	49,600	79,950	93,700	93,850	110,150	102,350	91,000	98,500
Indiana-Illinois	6,000	2,200	5,250	6,800	16,950	17,150	6,950	8,600	9,100
Iowa, Mo., Kans., Okla., Ark and Tex. r	25,250	33,600	45,800	52,300	67,800	80,650	81,650	76,000	85,000
Colorado s	82,000	90,850	120,750	139,100	161,000	174,350	174,950	184,350	174,200
New Mexico t	23,800	25,050	11,350	26,600	35,050	42,000	39,950	35,300	37,500
Utah u	59,700	54,000	47,350	56,300	61,750	74,000	80,300	79,500	85,520
Wyoming, Montana and N. Dakota	7,000	7,500	5,650	5,800	8,800	8,800	9,650	12,500	16,000
Washington	18,500	19,700	17,850	18,450	16,250	20,700	19,450	21,000	21,100
Michigan	0	0	0	0	0	0	0	0	0
Grand total	3,158,750	3,097,250	3,924,300	4,348,650	4,607,250	4,764,650	4,656,250	3,659,850	3,444,320

* Total for July 17, 18 and 19, multiplied by 2.

(a) Includes loadings on following railroads: PRR., Allegheny, Renovo, Pitts. East, Central, Snow Shoe, Tyrone, Bellwood Br., Cress, via Cress., Cress, via Bell.; J. & S. C.; Lig. Vall.; Camb. & Ind.; B. & S.; Susq. & N. Y.; Pitts. & Susq.; Pitts. & Shaw.; P. S. & N.; N. Y. C.; Franklin, Penna.; Erie, Bloss.; P. R. P.; Cent. Pa.; E. Broad Top; H. & B. T. M., Broad Top.

(b) L. E. F. & C.; P. L. & W.; B. & L. E., But. Mer.; PRR., Erie & Ash.; W. Alleg.; B. & O., Pitts.; Montour; P. & W. Va., Avella, Pitts.; P. & L. E., Pitts., PRR., Monog.; Union, Pitts.; B. & L. E., Freeport.

(c) PRR., Pitts. Mid., Pitts. West., Conemaugh.

(d) Monongahela, Penn.; PRR., So. West Br.; B. & O., Connellsville; W. M., Somerset, Connellsville.

(e) PRR., Pitts, So. Fork.

(f) Cumb. & Penn., W. M., Geo. Cr. Thomas; B. & O., Cumb.; W. Va. Nor.

(g) B. & O., Wheeling; PRR., Wheeling.

(h) B. & O.,Monongah; Monongahela, W. Va.; W. M., Weaver, Fairmont.

(i) B. C. & G.; B. & O., Charleston.

(j) K. & M., Kanawha; C. & O., Kanawha, Coal River.

(k) C. & O., Logan.

(l) C. & O., New River.

(m) Virginian.

(n) A. C. & I., E. Ky.; C. & O., Ky.; Miller's Cr.; Long Fork; S. V. & E.; L. & N., E. Ky.; Cumb.; Ky. & Tenn.; L. & N., Ky., C. V.; Southern, C. N. O. & T. P.

(o) I. C., Ky.; L. H. & St. L.; L. & N., Hender., O. & N.

(p) L. & N., Knox.; N. C. & St. L., So. App.; Sou., Coster; H. & N. E.; Tenn. Cent.

(q) N. & W., Clinch Vall.; C. C. & O.; Interstate; Sou., Appal.

(r) C. R. I. & P., Mo., Okla., Tex.; C. B. & Q., Mo.; Q. O. & K. C.; Bev. & Sou., Mo.; K. C. C. & S., Deepwater; M. K. & T.; M. O. P.; St. L. & S. F., Ark., Kans., Mo., Okla.; A. T. & S. F., Mo., Kans., Okla.; U. P., Lansing; K. C. S.; Ark. Cent.; Mid. Vall.; Ft. Smith & W.; K. O. & G., Deer-Hen; R. G. & E. P.; I. & G. N.; Tex. & Pac., Mingus, Strawn.

(s) D. & S. L.; D. & R. G., Colo.; A. T. & S. F., Colo.; C. R. I. & P., Colo.; C. W. & E.; C. & S. Colo.; C. B. & Q., Colo.; U. P., Colo.

(t) A. T. & S. F., Gallup; E. P. & S. W., Raton; N. Mex. Mid.; S. F. R. & E.

(u) D. & R. G., Utah.; Utah; Un. Pac., Utah.

Foreign Market And Export News

Buying of British Coal for American Needs Proceeds Rapidly; Price Reported at $9

BRITISH coal to relieve the shortage in the Eastern United States became a reality last week, when, following the refusal of the miners to arbitrate, it appeared a certainty that the strike in this country is not to be settled at once. Buyers and wholesalers here have hesitated to take a chance on bringing in foreign coal, with a two-week minimum haul, so long as there was any chance of early resumption of mining. Now that all hope is gone and the shortage produced by the railroad strikes has become acute, buying of British coal has been rapid.

In the first ten days not less than half a million tons were bought and within a few days all available bottoms had been chartered. The U. S. Shipping Board ordered all ships in foreign waters suitable for coal cargoes to the British Isles and promised to recondition and send abroad all boats needed for this trade. At present it is boats and not coal that is putting the brake on importation of coal, for Britain's supply is ample and prices are easy.

The Shipping Board has set a price of 7s. per ton for freight and this with the current Cardiff price would put coal in New York Harbor for around $7.50 per gross ton. On Monday, July 24, there were reports that the price had mounted to $9 per ton.

U. S. Demand Aids British Industry.

Production in Great Britain during the week ended July 8 was 4,598,000 gross tons, according to a cable to *Coal Age*, as compared with 4,530,000 tons in the week preceding.

Considerable inquiries are being received in South Wales from the United States, Canada and the West Indies. This is stimulating Continental buyers who recently have been holding back hoping for lower prices. Newcastle reports business brisk on American inquiries for all descriptions.

During the earlier part of last year it was common assertion, and a true one, that the high cost of coal in Britain was retarding industrial recovery. Since then prices have been brought down to a point at which neither the miner nor owner is receiving adequate remuneration. The mining industry has done a great deal more than its fair share toward accelerating the revival of trade, and it can give no more.

For some months past the attention of producers and manufacturers has been directed toward the railways for relief in lightening the burden upon industry. They have submitted what is admittedly an overwhelming case for substantial reductions in transport charges, but unfortunately they have derived small satisfaction from their representations. The railway companies have so far conferred little more than their blessing on a war-stricken country. What reductions they have conceded, viz.: a 12½ percentage reduction and a lowering of the flat rate from 6d. to 3d.—amount to about a quarter of what is considered necessary to restart trade.

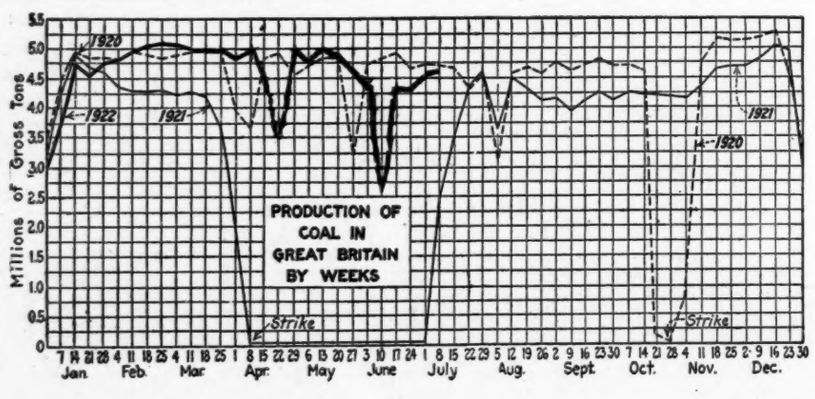
Publish French Prices; Demand Up.

Publication of the new prices of the Nord and Pas-de-Calais has momentarily increased the demand.

These prices—which particularly in the Paris area, are still higher than those of British imported coals—are provisional prices which were fixed pending the solution of the present conflict between operators and miners and the granting of lower transportation rates on coal.

It has been reckoned that to stem the rush of British coals French coals should be 20 frs. cheaper. One hour's extra work in the mines would decrease the cost by 10 frs. a ton. It is to be hoped that French miners will be sensible enough to listen to the dictates of reason and to agree to an increase of their effective underground working time from 6¼ to 7¼ hrs.

Production was 2,538,000 metric tons in May, as compared with 2,479,000 tons in April; May output of coke was 82,000 tons, 2,000 less than the April figure, while briquet production was 212,000 tons, as compared with 190,000 tons in April.



Coal Paragraphs from Foreign Lands

ITALY—The price of Cardiff steam first was quoted at 36s. 3d., on July 21, according to a cable to *Coal Age*.

GERMANY—Production of coal in the Ruhr district during the week ended July 8 was 1,629,000 metric tons, according to a cable to *Coal Age*.

Hampton Roads Market in Turmoil.

The market was in a turmoil last week, with supplies rapidly diminishing and ships being diverted for lack of coal. The N. & W. piers are almost at a standstill because movement of coal over that road has been cut down to a minimum by the railroad strike.

Schooners and barges pressed into service to carry coal coastwise when the rail strike began, are now lying idle in large numbers. As coal grows scarcer quotations are rising until the average price of coal this week lay between $7 @ $9 for all grades.

The market was so nearly demoralized on account of the absence of coal to sell, that a fixed price list was impossible. Large supplies of Navy coal, held at the Naval Operating Base, were being considered for their availability to be used in the emergency to serve merchant ships.

Hampton Roads Pier Situation.

	Week Ended July 13	Week Ended July 20
N. & W. Piers, Lamberts Point:		
Cars on hand	984	567
Tons on hand	61,352	31,485
Tons dumped	167,627	194,896
Tonnage waiting	20,000	2,000
Virginian Ry. Piers, Sewalls Point:		
Cars on hand	1,522	1,053
Tons on hand	83,950	59,450
Tons dumped	128,640	107,710
Tonnage waiting	38,000	62,825
C. & O. Piers, Newport News:		
Cars on hand	1,090	555
Tons on hand	76,000	27,750
Tons dumped	92,728	94,833
Tonnage waiting	5,015	15,765

Pier and Bunker Prices, Gross Tons

PIERS

	July 15	July 22†
Pool 11, New York	$7.50@$7.75	**$10.00@$11.00**
Pool 1, Hamp. Rds.	6.50@ 6.75	**7.00@ 9.00**
Pools 5-6-7 Hamp. Rds.	6.25@ 6.75	**7.00@ 9.00**
Pool 2, Hamp. Rds.	6.25@ 6.75	**7.00@ 9.00**

BUNKERS

Pool 11, New York	$8.00@$8.25	**$10.00@$11.00**
Pool 1, Hamp. Rds.	6.50@ 6.75	**7.00@ 9.00**
Pool 2, Hamp. Rds.	6.25@ 6.75	**7.00@ 9.00**
Welsh, Gibraltar	43s. f.o.b.	43s. f.o.b.
Welsh, Rio de Janeiro	57s.6d.f.o.b.	57s.6d f.o.b.
Welsh, Lisbon	43s. f.o.b.	43s. f.o.b.
Welsh, La Plata	50s. f.o.b.	50s. f.o.b.
Welsh, Genoa	42s. t.i.b.	42s. t.i.b.
Welsh, Messina	39s f.o.b.	39s. f.o.b.
Welsh, Algiers	38s 6d f.o.b.	38s.6d.f.o.b.
Welsh, Pernambuco	65s. f.o.b.	65s. f.o.b.
Welsh, Bahia	65s f.o.b.	65s. f.o.b.
Welsh, Maderia	42s.6d.f.a.s.	42s.6d.f.a.s.
Welsh, Teneriffe	40s.6d.f.a.s.	40s.6d.f.a.s.
Welsh, Malta	44s.6d.f.o.b.	44s 6d f.o.b.
Welsh, Las Palmas	40s.6d.f.a.s.	40s 6d f.a.s.
Welsh, Naples	38s.f.o.b.	38s.f.o.b.
Welsh, Rosario	52s.6d.f.o.b.	52s.6d.f.o.b.
Welsh, Singapore	55s. f.o.b.	55s. f.o.b.
Welsh, Constantinople	50s. f.o.b.	50s. f.o.b.
Port Said	49s. f.o.b.	49s. f.o.b.
Alexandria	43s. f.o.b.	43s. f.o.b.
Capetown	35s. 3d.	35s. 3d.

Current Quotations British Coal f.o.b. Port, Gross Tons

Foreign Quotations by Cable to Coal Age

Cardiff:	July 15	July 21†
Admiralty, Large	24s.@24s.6d.	**25s.**
Steam, Smalls	17s.6d.@18s.6d.	**18s.@18s.6d.**
Newcastle:		
Best Steams	23s.@24s.	**24s.@25s.**
Best Gas	21s.6d.@22s.6d.	**22s.6d.@24s.**
Best Bunkers	20s.6d.	**21s.6d.**

†Advances over previous week shown in **heavy type**: declines in *italics*.

North Atlantic

Big Buyers and Consumers Ward Off Panic Prices

Scarcity at Piers Causes Small Users to Offer Any Price—Railroads, Utilities and Industrials Order English Coal—First of British Product to Arrive in a Week.

NOTHING but the extreme care being exercised by the larger consumers and buyers of coal has so far prevented a price situation in this territory as panicky as that in Chicago. There is so little coal at the piers at New York, Baltimore and between (238 cars at New York piers, for instance, on July 24) that small consumers in need are offering any price to get coal.

Last week was notable for the sudden turn to buying of English coal. Railroads, public utilities and large industrials placed orders through their connections and some steamship companies are now reported to be undertaking importation on their own account. It will be a week yet before the first of the English coal reaches these shores and it will not be available in quantity until well into August.

NEW YORK

Lack of cars resulting in a shortage of coal was in part responsible for a rapid advance in quotations during the week. It rose as much as $1.25 and the quality of the coal offered was hardly considered.

An additional feature was the placing of orders for tonnages estimated at 100,000 tons by local houses for English coal, some of it for immediate delivery and some for August. It was figured out that this coal would be brought into New York harbor at a figure close to $7.50 c.i.f.

Public utility corporations are well supplied with coal, according to reports filed with the governing commissions.

Southern coal, because of the low production due to the lack of cars, is not being brought here in large tonnages. Quotations ranged as high as $10.50, New York harbor.

On July 21 there were 376 cars at the local piers, much of which was on contract and quickly taken away. The grade rarely figured in purchases and quotations ranged around $10.

Quotations changed frequently and buyers were forced to act quickly if they wanted coal. At the end of the week Pittsburgh steam coal was quoted around $6.50 f.o.b. mine; and gas coal $1 higher. While Allegheny Valley coals were quoted $7.50, some purchases were reported as having been made at a much lower figure. Clearfield coals were quoted $6@$6.50.

BALTIMORE

As far as can be learned, no genuine attempt is being made to re-open the mines in Maryland under the protection plan of President Harding. Governor Ritchie, of this state, has refused to send troops to protect the mines at this time, taking the ground that this action is not needed at present. In his communication to President Harding he stated that one of the troubles of the Maryland situation was that the railroads were not supplying sufficient cars to the mines, but this has been vigorously denied in railroad circles.

There is no export coal loading at this port, but some fuel is still being taken in bunkers; 11 ships took 2,921 tons in bunkers from July 1 to 20 inclusive. Quotations of price for soft coal from mining regions show a sharp advance over a week ago. Quotations from openings in fields to the south of this point are all the way from $4.25 @$5.25 per net ton.

CENTRAL PENNSYLVANIA

Feverish activity characterized the market following the breaking up of the conference at Washington. Previous to that, the market was dull, many buyers holding off in the expectation that an agreement between the miners and the operators would bring about a resumption of production and a consequent reduction in prices.

B. & O. coal was being sold on July 18, at $4.75 and on July 19, went to $5, then to $5.25, with every prospect of going to $5.50. Coal is scarce due to the shortage of cars, there being none distributed by the B. & O. on any sidings during the closing days of the week. Prices on P. R. R. loadings range $4.75@$5.75, most of which is being produced by small mines.

Just what move will be made to operate the larger mines remains to be seen. Several operators have posted notices setting forth that mines will be put into operation as soon as they can be gotten ready and a sufficient number of men employed to insure a steady output.

PHILADELPHIA

The situation is pretty badly muddled. Little coal is coming to this market. Despite the scarcity it is somewhat odd to hear shipping houses advise that the number of inquiries are far less than they would expect under such a state of trade. However, there are many inquiries, but mostly from the large consumer, and there are plenty of rumors of steel plants in this neighborhood about to close down.

Prices seem to have vanished into the air during the latter part of the week, in fact, many houses are simply in a position where they have no coal to offer at all. In asking for coal the consumer has about given up trying to purchase fuel of any particular grade and is well content to take just coal. Despite the strongest kind of efforts to keep down prices, there is a tendency toward a runaway market. Rumors of prices as high as $8 at the mines have been heard. However, even if sales are made at these figures they cover but a meager tonnage, as there is so very little free coal.

Large users are making inquiries for prices on English coal, and already some business of this kind has been placed. The price of the coal landed at the piers here seems to be between $8@$9, and it is also stated that some foreign coal is booked for arrival at local piers for delivery to interior points.

FAIRMONT

Mining was largely at a standstill during the second week of the rail strike owing to a general break-down of transportation facilities on the B. & O. Few cars were being placed except for railroad fuel purposes. Some relief was experienced when the Western Maryland began taking loads at the rate of 75 a day from the Elkins Division of the B. & O. Inquiries for fuel were numerous but most operators were not in a position to make or assure deliveries.

UPPER POTOMAC

Mines were not affected by transportation disabilities to as great an extent as in other parts of West Virginia, the Western Maryland being able to handle the tonnage originating on its own line as well as some of the tonnage off the B. & O. A few more mines resumed operation. There was a heavy demand for coal in all pools.

South

BIRMINGHAM

General demand for all grades continues good and some difficulty is being experienced in placing some of the spot business coming in, as there is comparatively little free coal to be had. The buying movement has become more diversified. Inquiries come in from all general directions, both in home and foreign territory and sales are reported at a premium above the regular quotations.

Another consignment of 4,000 tons of gas coal was loaded at Mobile this week for Peruvian interests, going to Callao, and some tonnage went to Cuba. The medium grades of domestic coal are finding a more ready sale lately. Most of the better grades are sold up well ahead and little is available in the open market.

Quotations on steam coal have advanced slightly:

	Mine Run	Domestic
Carbon Hill	$2.50@$2.60	$2.30@$2.55
Cahaba	2.60@ 2.75	3.05@ 3.85
Black Creek	2.75@ 3.00	3.05@ 3.30
Corona	2.60	3.25@ 3.50
Montevallo		4.10@ 4.35

Output for the week of July 15, will probably reach 340,000 tons, although much time has been lost throughout the district account of poor car supply and transportation service.

VIRGINIA

The rail strike has operated to reduce production, such curtailment growing out of the inability to move loads promptly. The rail strike is about all that prevents capacity production since there is an excellent market. Producers are generally adhering to $3.50 for mine run.

Anthracite

Clean-Up of Leftover Hard Coal Now in Sight

Withdrawal of Prices on Pea Foreshadows End of Storage Piles—Householders Active in Market—Importance of Early Booking.

TWO of the larger companies are reported to have withdrawn prices on pea coal and others are expected to follow soon. When pea is no longer available from company storage the last of the leftover hard coal will be in the hands of dealers, and very soon thereafter, of householders.

Orders are being booked with assurances that when the mines resume the coal will be delivered in order of booking.

No attempt is being made, and none is expected to be made, by the operators in the hard-coal regions to resume work without the consent of the union, despite the assurance of the Governor that protection will be afforded to all who want to work.

NEW YORK

As the headlines in newspapers tell of a prospective coal famine consumers are aroused to the existing situation and are looking around for coal for the coming winter. Retail dealers are kept busy telling their customers there is no coal to be had, excepting pea, and that there is no telling when it will be available.

While most dealers within the city limits are nearly out of the domestic sizes line dealers and those on the outskirts of the Greater City have a fair tonnage on hand.

Pea coal is moving rapidly. This is the only size the companies have and their storage piles are rapidly disappearing.

Some independent buckwheat was offered here around $5, f.o.b. mine. River barley was quoted $2 @ 2.25, a slight advance over the previous week. Because of the rapid increase in quotations for bituminous coal the demand for this size strengthened considerably. Loaded boats of buckwheat were reported at $7.50@$7.75, alongside.

BOSTON

Retailers' stocks in the large cities are being rapidly depleted. Practically no distributor in Boston is now in position to make deliveries to householders of more than a ton or two at a time of either broken, egg, stove or chestnut. What small reserves there are the dealers are saving for hotels, hospitals and other necessary uses, rather than for dwellings, where no heat will be required for at least 60 days.

At wholesale the only size now being offered in any quantity is pea. Within a few days two of the large producing companies have withdrawn prices even on that size, and are no longer willing to obligate themselves for shipment. Certain of the anthracite roads are absorbing tonnages of pea for locomotive use and prices are likely to stiffen materially during the coming week.

BALTIMORE

The anthracite situation is tense. At this writing the city is about 250,000 tons short of the usual amount either already delivered to consumers or in the yards here. As the strike apparently is still a tight affair the dealers of Baltimore figure that there is going to be tremendous difficulty in supplying consumers even with moderate needs next autumn. Except for a small quantity of pea coal now in the yards here, dealers have been swept clear of supplies. Consumers are now growing restive and are calling up their retail supply connections in an effort to assure deliveries, if not at present, then before cold weather sets in.

ANTHRACITE FIELDS

The mayors of Wilkes-Barre, Scranton, Carbondale, Pittston and Hazleton, accompanied by Senator Pepper of Pennsylvania, called on President Harding at the White House, on July 22, and outlined a plan of settlement of the strike in the anthracite field. While not divulging its nature, the mayors stated that the plan has been discussed with John L. Lewis and will be the further subject of conference with the union leader and representatives of the operators.

BUFFALO

With the supply practically all gone it seems odd that so little is said and that nothing has been done about the resumption of mining. The inquiry for it increases steadily. Canadian dealers are anxious, but all that can be said to them is that they shall have coal as soon as it moves.

PHILADELPHIA

From a feeling of hopefulness the retailers have now fallen into a state of doubt of an early resumption of mining. There was a belief that the men would accept the arbitration plan, but this having been rejected, no definite date is seen for the end of the strike.

There is a steady increase of consumers calling for coal, and as a result all retailers continue to move a fair stock of pea. Dealers from all sections are sending in moderate orders for this size.

Heavy orders for pea are coming in from Western points, as well as from Northern territory. One of the companies has now announced that it has no more for sale. Already it is reported that some of the railroads have taken some pea for motive power fuel.

River barley continues in strong demand and one of the railroads is reported as trying out a consignment of this coal. Prices are firm, with an inclination to increase, a few sales being reported at $3, but the average is still $2.25@$2.75.

Coke

CONNELLSVILLE

Offerings of coke have decreased farther, partly on account of the fresh strikes that followed the assembling of the conference at Washington, and partly on account of insufficiency of transportation produced by the railroad shopmen's strike. Prices have been advancing, causing miscellaneous consumers generally to drop out of the market, as the furnaces did long ago, while there remains buying by foundries. As coke is a small part of the cost of finished castings the foundries do not balk at price.

Connellsville foundry coke has sold at $14, and it is rumored one carload went at $15. For furnace, $13 has been quoted.

At least half a dozen furnaces have been banked or blown out in the past week on account of failure of supply, chiefly coke made at byproduct ovens where receipts of West Virginia and Kentucky coal are almost stopped by transportation disability.

The *Courier* reports production during the week ended July 15 at 52,300 tons by the furnace ovens, and 11,620 tons by the merchant ovens, a total of 63,920 tons, an increase of 10,000 tons, representing a two-thirds recovery from the decrease in the holiday week.

UNIONTOWN

Invitation of President Harding to operators to resume production of coal backed up by Pennslyvania National Guardsmen has not as yet changed the situation in this region. It is expected that a more or less concerted effort will be made next week by a number of operators to bring a "showdown," although plans are more or less guarded. W. J. Rainey, Inc., has posted notices to the effect that it will comply with the President's invitation and resume operations, but the notice has had no effect upon striking employees and no effort has been made to obtain outside labor.

Meantime the market is bounding upward like a skyrocket. At 25 and 50c. a ton hard-pressed consumers are pushing it upward until it is impossible to quote any price today with any certainty that it will remain a factor tomorrow. A price of $7.50 is generally quoted now, but there is no indication that that is the limit. Announcement from Washington that a coal-rationing plan is being considered is believed to have caused some consumers to scurry around, placing large orders before the rationing commences.

BUFFALO

The entire giving out of supply from the Connellsville district has not obliged dealers to give up quotations on that basis, but that can hardly be called an improvement, for byproduct coke is an uncertain quantity, from the fact that, as a rule such plants exist for the purpose of supplying nearby furnaces and the surplus is small. One jobber quotes a good byproduct at $11 for the lower grades and $11.50 for foundry, to which $1.31 must be added for freight.

Chicago and Midwest

Flight of Coal Prices Leaves Men Breathless

Western Kentucky Shoots Up More Than $1 a Day—As It Passes $11, Pittsburgh Coal at $9 Appears and Slows Ascent—St. Louis Suffers.

HECTIC market conditions continued through the past week in the Midwest region. With Chicago always at the peak, prices soared dizzily on every coal traded in in every market where any of it was offered. Western Kentucky reached $11.50 at Chicago Saturday night at the end of a drunken upward career—an ascent of $5 from the Monday before—and smokeless and eastern Kentucky attained $9.50, though very little of these two coals was available. The level had crawled so high that Pittsburgh coal appeared in considerable quantity and was bought greedily at $9. At the end of the week trading was in car numbers only.

Excitement in the fields tributary to this region continued at high pitch. There was no telling, from hour to hour, what coal would sell for in each succeeding period.

Even country trade has shown a noticeable pick-up, for dealers everywhere perceive the folly of expecting coal to sell at ordinary prices next winter and most of them are willing to stock right now at whatever figure the market dictates. Dealers are seeing many a consumer getting shorter and shorter of fuel and they can see plainly what is going to happen soon.

The shortage is getting so keen in the St. Louis territory that the Governor of Missouri is considering a coal apportioning plan for the state and the Mayor of St. Louis may attempt the same thing for the city. Municipal institutions there are said to be within a week of a boiler shutdown. In Illinois a number of coal consumers such as town lighting plants are suffering keenly—and without hope. In one or two cases they have shut down and are drawing power from bigger central stations.

CHICAGO

Western Kentucky coal went a long way this week toward spoiling its own game of aviation. Prices soared $5 or more between Monday morning and Saturday noon, causing consternation at times as the market made its dollar jumps each day. Many a jobber had his fingers burned by taking orders at an agreed price, only to have the coal hurdle his price before he could deliver it. That was at the first of the week. Later that practice stopped. Dealing was then altogether in car numbers and prices were never set until the coal was delivered.

The gay and hilarious daily hoisting of prices put the market up to a point finally where, by Friday, Pittsburgh coal began to appear. This newcomer, making its first appearance here in a long time, could, with a freight rate of $2.84, compete at a price of $9; for by Friday western Kentucky had passed that niggardly figure. By Friday night, in fact, western Kentucky had reached $11. But the next day its rapid flight appeared to be somewhat checked. It did not pass $11.50 in spite of herculean efforts of a few who tried to open the day at $13. The Pittsburgh coal—more than 100 cars of it—may have been responsible.

No other coals cut much of a figure on this market, principally because of difficulties incident to the railroad strike. A little smokeless and eastern Kentucky filtered into town a few cars at a time, selling readily at $9 and $9.50 at the end of the week, but the quantities were small. A slight recovery of the Louisville & Nashville from its attack of general debility made it possible for a thin flow of coal to start from fields along its lines, but the volume which reached here was small.

SOUTHERN ILLINOIS

Peace appears to reign throughout all southern Illinois coal fields, though there is a tenseness to be observed among miners which might indicate either a willingness to go back to work at the first opportunity or a fear that the government is going to do something to the union. The coal supply of the fields is exhausted and there is no production at any of the out-of-the-way wagon mines or strip pits.

ST. LOUIS

For the first time since last April the situation is becoming serious here. At many points in the state as well as in southern Illinois coal is unobtainable for municipal plants and other essential industries.

In St. Louis proper, another ten days will see the coal cleaned up excepting at the big utility plants and at the city water works, where there is about a month's supply ahead. The city institutions will be out of coal within a week unless relief from some unknown quarter develops. Domestic customers are making no demand for coal.

Kentucky coal, which was selling at the close of last week for $5, went up Monday to $6 and finished up the week at between $7.50 and $8 with no operators willing to take an order. They expect the price next week to be as high as $10 to $12 at the mine for mine run.

WESTERN KENTUCKY

An advance of easily $4.50 a ton in the price of western Kentucky coal was posted during last week. On Monday, July 17, the market jumped rapidly, closing at around $6.25 a ton, going to $6.75@$7 on Tuesday, $7.25@$7.75 on Wednesday, $8@$8.50 on Thursday and $11 on Saturday. However, there were practically no cars in the fields, especially on the Louisville & Nashville R.R.

The railroads and public utilities are wild for coal. Such great companies as the Commonwealth-Edison Co. of Chicago offered $7.25 a ton, or 25c. over first offers on Wednesday morning, in order to secure tonnage.

During the past week the Harlan field got out a little tonnage for the first time since the rail strike started. The Norfolk & Western and the C. & O. are having some trouble in the Kentucky-West Virginia district, and the L. & N. has been having much difficulty, with the result that tonnage from the non-union fields of Kentucky and the Virginias has slumped badly, while surplus stocks have been reduced to a minimum and demand is increasing daily. Production is probably at about the lowest ebb since April 1.

INDIANAPOLIS

The skepticism with which the general public is viewing the invitation of Governor McCray to the operators to open their mines, is reacting on the coal market. During the past few days there has been a mad scramble for coal on the part of industrial users. The visible supply is fast shrinking and Indiana at the present time is faced with the most serious coal shortage for years.

Many industrial users have been holding off for two or three weeks and using their reserves in the forlorn hope that the strike would be over by this time. Regardless of all that is said and done, the average citizen of Indiana has but little faith in the ability of operators to successfully operate mines without the aid of the organized miners.

LOUISVILLE

Apparently the Kentucky operators have thrown all caution aside, and either are figuring that there is no danger of federal control, or that they should get every nickel possible while the getting is good. The market has been jumping wildly. Supplies in large consumers' hands are at the vanishing point, and coal must be had at any price in order to keep railroads and public utilities supplied. It is reported that at the advanced figures there will not be much Lake movement just now. Car supply has become very poor.

Canada

TORONTO

The coal situation is growing more serious every day. Domestic orders are coming in with a rush but dealers are unable to make deliveries as there is practically no anthracite in the yards excepting a little pea coal. Soft coal is getting scarce as the railway strike prevents shipments from coming forward. Prices are much unsettled and with an upward tendency. Quotations (nominal as regards anthracite) are as follows:

Retail	
Anthracite egg, stove and nut	$15.50
Pea	14.00
Cannel	16.00
Wholesale f.o.b. cars destination	
¾-in. lump	$10.00@$10.50
Slack	9.50@ 10.00

Eastern Inland

Uncertainty Among Buyers And Sellers; Prices Mount

Feeling Is that Resumption Must Come Soon — Jobbers Wary of Being Caught with High-Priced Product on Hand—Rumors Emanate from Pittsburgh.

MUCH uncertainty prevails among consumers and sellers of coal in this area. Prices are steadily mounting as each day new consumers come into the market in urgent need of coal, but there is a feeling that the situation cannot continue for long and that the mines will soon resume operation. No jobber wishes to get caught with high-priced coal on his hands and this type of dealer is proceeding with caution.

The price is being set by the buyer in his eagerness to get car numbers, and in the process the Hoover price level has long since been passed.

At Pittsburgh there are rumors of much activity in getting certain mines ready to operate non-union, or at least without the consent of the United Mine Workers, but no coal has come from these mines as yet.

BUFFALO

Plenty of uncertainty, plenty of people to say what should be done, plenty of operators ready to go to work if the machinery will run, but nothing done yet. Coal is giving out pretty fast and will be gone in some districts before there is more. The consumers know this and are bidding high for it.

Bituminous coal is about $1.50 a ton higher than it was a week ago and if no addition is made to the output it may go still higher. Reports of selling an allotment and of plants shutting down increase.

The grain movement keeps up well and ore is moving at a good rate, but for the present the best Virginia bituminous coal that came in so liberally from Ohio ports early in the season has been shut off entirely. None has been reported for a week. Bunker coal is becoming so scarce that only small amounts are to be had at any port. If this shortage continues some of the fleet will have to tie up.

PITTSBURGH

Immediately upon President Harding "inviting" the operators to return home and produce coal, active work was begun in getting several mines ready for resumption. Many miners were disposed, late in June, to return to work if given full protection, but whatever the intentions may have been the actual proceedings at Washington were followed by a stiffening of the backbone of the strike, and resumption will now be more difficult.

Two entirely separate efforts at resumption are in progress, by certain operators in the Pittsburgh (union) district, under the advice of the Pittsburgh Coal Producers' Association, and by operators, particularly the H. C. Frick Coke Co. (Steel Corporation) in the Connellsville region, non-union for more than a generation although the U. M. W. claims it has been largely organized lately.

The only coal traded in to any extent of late has been Connellsville, the offerings of which have been slightly reduced by fresh strikes and by insufficiency of transportation. The urgency of certain buyers, particularly public service corporations, has been greatly increased, chiefly by reason of the interruption of deliveries of West Virginia and Kentucky coal. Nearly every day in the past week Connellsville coal has advanced 50c, being now strong at $7.

COLUMBUS

The combination of the coal miners' strike and the railroad trouble is pretty effectually tying up the coal trade. While there is a fair tonnage still being produced, lack of transportation facilities is causing much anxiety in all quarters and there is an acute shortage in certain sections. The entire price situation is wild and uncertain and quotations ranging $3.50 @ $7 are heard.

Some of the larger operators are making an effort to abide by the Hoover levels but they are not meeting with much success. What free coal is on the market is commanding higher figures and since it is a bidder's market the highest bidder gets the coal.

Retailers are now coming into the market to replenish their stocks. Some householders, expressing anxiety, are buying their winters' supply. Retail prices have advanced to higher levels in sympathy with mine quotations.

Lake trade is falling off. The H. V. Docks at Toledo during the week ended July 19 loaded 57,354 tons as compared with 96,688 tons the previous week. A total of 1,455,692 tons has been loaded by these docks since the opening of the season.

EASTERN OHIO

That reserve stocks are nearing exhaustion and that a fuel crisis looms in eastern Ohio is evidenced by developments during the week. The quantity of coal now reaching this section is the smallest in years and operators and jobbers are being besieged by industrial consumers.

Stripping operations in eastern Ohio have been curtailed, not so much by a lack of transportation as by interference and intimidation of employees by union miners.

Indications are that public utilities in this territory have limited reserves of fuel. Industrials and steamship lines in many instances have already found it necessary to restrict their activities because of limited fuel. The Detroit & Cleveland Navigation Co. has temporarily retired two steamers between Cleveland and Detroit and in the Mahoning Valley the operations of steel plants are being seriously retarded, and blast furnaces are being banked.

Increased demand and the diminishing quantity of coal available have boosted prices. The maximum has moved up from $5.25 to $7@$7.50. Pittsburgh and Kentucky gas coal is quoted at $7.75@$8 f.o.b. mines, while the range of spot prices on coal from other districts is $7@$7.50.

NORTHERN PANHANDLE

Since the beginning of the rail strike feeling between union and non-union miners has been intensified, striking railroad pickets having attempted to intimidate the miners to some extent. Mines are not being affected much by additional strike troubles. Inability of the B. & O. to move coal is affecting production to a greater extent than the strike of miners. This is limiting the movement largely to railroad fuel.

DETROIT

Interest of buyers is apparently not very generally aroused, although the shortening of supply is beginning to be noticeable. Demand can scarcely be classed as active or urgent except in a few cases.

The principal difficulty now being experienced is in getting coal from mines to docks on Lake Erie or through by the all-rail route. This impediment is an outgrowth of the railway strike rather than the mineworkers' strike.

Some buyers are negotiating with the mines for coal on the basis of $7 at the mines. It is believed, however, that these are exceptional instances as the business coming to jobbers and wholesalers is not of large proportions and incoming shipments are small.

CLEVELAND

The situation in this district is doubly acute. Not only are local consumers clamoring for fuel, but the demand from the Northwest is centering here. Meanwhile conditions are moving rapidly from bad to worse. The sky is the limit for prices, recent quotations ranging up to $6.50 and $7 per ton for the non-union grades. This coal, however, is extremely scarce, not only because of the enormous demand but declining receipts as well. The plight of the Northwest is reflected in the fact that at present the dumpings of coal at lower lake ports is around 500 cars daily, whereas the normal figure at this season is 2,500. The up-lake movement is now about 4,000,000 tons against 11,500,000 for the same period of last year.

The Cleveland Chamber of Commerce has appointed a committee to act in the emergency.

Many Cleveland industries are being crippled. The fact that 75 per cent of the industries are supplied with power by the Cleveland Electric Illuminating Co., is preventing more widespread distress, as the illuminating company is fairly well supplied with fuel.

Ohio operators with headquarters in Cleveland thus far have made no move to start operations under military protection and the majority of them probably will not do so.

Northwest

Federal Distribution Plan is Encouraging

Northwest Believes It May Get Enough Coal by That Agency—Dock Men Are Using Allotment Scheme Already—No More Upbound Cargoes Due.

THERE is a ray of hope for the Northwest in Secretary Hoover's promise to Governor Preus, of Minnesota, and to others that the region is going to get preference in coal shipments when the government's new scheme of coal apportioning goes into effect. However, that is about the only cheerful thing the people of the Northwest have to think about in connection with coal. Lake shipment of coal from lower ports has stopped and no more cargoes are scheduled. Stocks of free coal are so low that in most cases orders will not be taken until they have been approved by dock-company headquarters. Prices generally are still going up.

Public utilities and industries throughout the region find themselves in various conditions. Most of the big utilities have enough fuel on hand to run until September, but among manufacturing plants the situation is grievous generally.

MILWAUKEE

The coal situation at Milwaukee is becoming very acute, and the nervous tension created by the dubious outlook for the coming winter is increasing daily. Dealers report a rush of orders from both city and country, which they are unable to fill. There is no anthracite on hand, except a small supply of pea size, and the soft-coal stocks that are not already contracted for cannot last longer than about 40 days more.

Public utilities, operating in the city, have enough fuel engaged to carry them through to the first of next year, according to estimates based on the average daily consumption. In the country, however, similar enterprises have only 17,000 tons of coal on hand, whereas the supply should exceed 125,000 tons. Lake steamers find it difficult to secure bunker coal. This naturally hampers lake transportation. Receipts by lake already are slowing up in consequence, and may soon cease entirely.

July cargo receipts by lake to date aggregate 131,699 tons of bituminous coal, making the season's soft-coal receipts thus far this season 737,960 tons. Receipts last year up to this time aggregated 467,656 tons of anthracite, and 1,437,151 tons of soft coal.

Pocahontas coal has been advanced 50c. per ton on all sizes, but the price of other bituminous coal continues unchanged. Screened Pocahontas now sells for $11.25, mine-run for $9.25, and screenings for $6.75.

MINNEAPOLIS

With the Governor of the state making vigorous efforts to get a priority on coal for the Northwest when deliveries are resumed, buyers of this district are beginning to appreciate that the situation is serious. And there is no assurance of an adequate coal supply no matter what the government may do. Ordinarily the domestic business begins to get considerable service by September 1. Since there is little chance of that this year, consumers are starting a rush for coal. Wholesalers are refusing many orders. Bidding is being done on coal for prompt shipment, and premiums are being run up quietly, but wholesalers are endeavoring to avoid this sort of thing, realizing the hereafter that will follow anything that savors of profiteering.

Efforts to use substitutes may lead to wood and lignite. Wood will be expensive but will do very well in cook stoves and airtight heaters. Lignite is difficult to handle in ordinary steam plants because it slacks and runs down through most grates.

DULUTH

Stocks on docks have decreased so here that the majority of dock concerns are selling only on release orders from their headquarters in Minneapolis. This method of apportioning is an effort to place coal where it is most keenly needed. Latest reports show but 185,000 tons of free bituminous remaining here, with anthracite in an even worse condition. Shipments have practically stopped, one cargo only having been received last week. At the same time assurance has been received that no more cargoes will be shipped to lower lake ports from here.

Public utilities in Duluth and Iron Range cities are well taken care of according to latest reports. The local plant of the Minnesota Steel Co. and the Oliver Iron Mining Co. have sufficient coal to continue work until December. Independent mining companies are reported as being in more serious condition.

The general impression here is that the strike will be broken before a general tie-up occurs. Secretary Hoover's assurance that the Northwest will receive preferential shipments as soon as mining starts, and in this way will be able to get its accustomed amount of coal here, is giving heart to all.

New England

Virginia Terminal Shortage Is Felt; Market Turns

Quotations Likely to Tend Upward Till Rail or Mine Strike Ends—Textile Resumption Not in Sight—Outlook Is for Fitful Buying in Small Lots.

SHORTAGE of coal at the Virginia terminals has made itself felt. While thus far there has not been demand enough to cause any very active bidding up of prices, it is clear that the market has turned and that quotations probably will tend steadily upward until either the shopmen's strike or the suspension of union mining is brought to an end. In this territory there are fair reserves, industrial conditions considered, but were the textile mills to resume full-time production there probably would be a notable shortage that would send prices soaring. However, there is no immediate prospect of any such general resumption here and buying will doubless continue to be scattered and confined to relatively small tonnages.

For distribution inland, rehandlers at Boston, Providence and Portland have little free coal. Receipts have begun to fall off, and factors here know that for the next few weeks their present stocks will not easily be replaced. Prices in consequence have risen to new high levels; $9 has been quoted on cars Boston, and actual sales at $8.75 are known, these prices being per gross ton. At the same time deliveries are being made on contracts, and one retail distributor in Boston has seen the way clear to name an average price of $7.45 per net ton delivered for 12,000 tons New River for delivery prior to Sept. 15.

Under the conditions it is no wonder that the British coal is likely to come here in quantity. As much as 500,000 tons has already been arranged for, it is said, all of it to be received at Atlantic ports, and this should be an influence not only in keeping prices within reasonable limits but also in making it clear to union leaders that consumers are not entirely helpless.

The trade is much interested in following reports from day to day of developments on the railways that serve the Pocahontas and New River fields. The serious breakdown on the Norfolk & Western is still the occasion of much anxiety, and New England will hardly feel easy over supply until conditions on that line show some improvement before long. Since April 1 that particular railroad has been a main channel of supply, and any interruption has serious implications.

Spot prices are bound to be more or less buoyant the next fortnight or so, if not longer. With anxious buyers in many different sections there is bound to be a certain amount of bidding for what free coal there is, and it would not be surprising to see $9 per gross ton f.o.b. vessel at Hampton Roads reached within a relatively short time.

Cincinnati Gateway

Big Demand for "Free" Coal Creates Three Price Levels

Offers Made at Scales, Between Mine Mouth and Weighing and Before Loading—Unsettlement Laid to Rail Trouble—Non-Union Output Drops and Car Movement Slackens.

DEMAND for "free" coal has grown out of all bounds of possibility of supply. The result is that there are really three prices to be reckoned with upon coal passing through the Cincinnati gateway. One might be called the scales price—that is, a price offer for coal that is about to be weighed by the N. & W. or the C. & O. or that has hit the main line of the L. & N. The second price might be said to apply to coal from the mouth of the mines to the scales and the third that for coal still to be loaded. Even this latter is split into two prices, for there are some firms still holding to the Hoover price even on free coal, while there are others who are getting the limit that the market will stand.

The backbone of the trouble is the rail congestion caused by the breakdown in transportation. Non-union production is curtailed and those cars under load are moving in at less than 50 per cent of normal.

CINCINNATI

Lake business is "shot." One cargo gathered up on Wednesday cost $6@$7 a ton. Casual buyers therefore are standing off. Country business is pretty much in the same boat—the dealers come here, look the market over and find out the prices that are being asked for coal and go back home again.

The whole situation has been created by the breakdown in transportation attendant to the shopman's strike and the others that have surrounded it. Thousands of cars are lying on the sidings that cannot be moved. Less than 30 per cent of normal of loaded cars were brought across the river this week; in round numbers this is a drop of 5,000 cars.

Smokeless agents frankly declare that they will have no coal to offer until the middle of next month. Logan has been hard hit and is moving only a few cars out to the main line of the C. & O. Hazard has a better car supply than surrounding fields and Harlan has worked only one day this month. Producers say that their costs are mounting and that every ton put on the cars this week has cost them $5@$6.

Retailers are still holding to the prices established the first of the month. They are warning customers, however, that they will soon be forced into the open market and that a rise in price can be expected.

LOW-VOLATILE FIELDS

New River and the Gulf

Labor troubles and the effects of the mine strike have been largely overcome in the New River field, but a shortage of cars has begun to seriously interfere with production. For a time there was a threat of trouble on Beard's Fork and Lower Loop. The demand for steam fuel is strong. There is a heavy demand at Tidewater.

Losses due to a shortage of cars in the Gulf region were somewhat more pronounced during the week ended July 15, and tended to make inroads on the output at a time when labor shortage was being overcome. The condition of motive power is making it difficult to move coal as promptly as usual and congestion was beginning to develop on the Virginian by the middle of the month, cutting down the movement to Tidewater.

Pocahontas and Tug River

By the middle of July a rather serious car shortage had begun to develop in the Pocahontas region, the lack of empties entailing a loss of about 45 per cent. The Norfolk & Western is unable to handle so large a volume as it did during June and hence there is congestion at various terminal points as well as on connecting lines. The general tendency was to move coal to Tidewater, owing to the short haul and the fact that loads did not have to be delivered to connecting lines.

Tug River mines, too, were suffering from the effects of a car shortage, amounting to about 45 per cent. There was more coal than usual on sidings and at terminals awaiting movement to market. Restricted movement of coal was tending to affect the steel operations since so large a proportion of the output of this territory is usually shipped to affiliated steel mills.

HIGH-VOLATILE FIELDS

Kanawha

Considering the obstacles to be overcome, the field was producing a fairly large tonnage during the second week of the rail strike, increasing its output to 70,000 tons, the largest since the strike began. Coal was not being moved so promptly as had been the case during the first week of July. It is more difficult to secure empties now than it was before the rail strike, but the need for empties is not as large in the Kanawha region as in some others. There are still more than 100 mines at work, however, despite some serious acts of violence.

Logan and Thacker

Handicapped by decreasing railroad facilities, Logan mines have been unable to keep up the pace recently set, although there is still a large output in this territory. Much of the output is being held up at connecting points owing to congestion on other lines. Producers are not finding it possible to get coal to the steel companies in sufficient quantities to keep them stocked. With the supply dwindling the demand is reaching even stronger proportions.

In the Thacker field the only factor which is interfering seriously is the railroad situation. Cars are much harder to secure because of the congestion at terminals on the Norfolk & Western and connecting lines. Not only is there a car shortage of about 45 per cent but it is becoming more difficult to move loads. Lake buyers are seeking large tonnages and the general movement to the West is large, insofar as transportation facilities permit.

Northeastern Kentucky

There is a serious curtailment of the output owing to the rail strike, the car shortage in that respect affecting production to the extent of about 20 per cent or more. Loads are not being moved expeditiously and congestion is resulting, in the face of a very strong demand.

West

KANSAS CITY

While it is true that the production of coal under normal conditions in the Kansas coal fields is small as compared with other coal producing districts, the production in Kansas today is about 25 per cent of normal and more mines are opening up. It will be recalled that about a year ago there was a split between Alexander Howat and John L. Lewis and each had his following and the miners that followed Howat are the ones that are digging coal today and apparently without any interference from Lewis' followers.

A more peaceful mining locality than the Kansas field would be difficult to find and is an object lesson to all and clearly shows what may be expected where there are two factions about equally divided. Howat is in jail, which may have something to do with the lamb-like demeaner of the men. If that is the case we can go farther and draw another conclusion: Put all radical labor leaders in jail and there will be peace.

Coal of all grades is scarce and hard to get. Some of the retail yards have sold out to the steam plants and are taking a chance of getting a supply later to take care of their trade. Prices fluctuate from day to day but the ruling figures on Kansas coals are about $3.75 for slack and $5 for lump.

SALT LAKE CITY

Business is improving. Some of the dealers are stocking up and there is a demand for Utah coal on the coast. One large firm—the U. S. Fuel Co.—reports more orders in all grades than it can fill, despite the fact that its production last month was more than double that for the same period last year. Some of the operators, however, have been badly hit by the strike and are producing much less than in normal times. The slack business is excellent and producing companies cannot meet the demand. The domestic consumer is not buying much yet but inquiries indicate a little uneasiness due to the strikes. It is believed that many storage orders will be placed at an early date.

News Items From Field and Trade

ALABAMA

It is rumored that stockholders of the **Alabama Company** have been asked to vote on an application for an option on the properties of the company to Lloyd H. Atkinson and associates, all of New York. The purchase price of the Alabama Company is given as $6,250,000 in the circular letter sent to all stockholders, asking them to accept or reject the request for an option. The executive offices of the company are in Baltimore. The properties of the Alabama Company consist of blast furnaces and several coal mines, most of which are now in operation, although they had been shut down for a long period.

Charles H. Nesbitt, chief mine inspector, attended the annual meeting of the Mine Inspectors' Institute of America, which was recently in session in Chicago.

ILLINOIS

Orders to start the work on the new power plant of the **Central Illinois Public Service Co.** at Grand Tower, have been given. The plant will be located near the Mississippi River at Grand Tower, to insure a year-around supply of water for its enormous turbines. The company furnishes a large per cent of the power consumed by the mines of southern Illinois. The company has power plants now in operation in more than ten centers in the southern part of the state.

The Union Fuel Co. announces the opening of offices at 332 South Michigan Avenue, Chicago, where the executive, sales and accounting departments will be located. Andrew Christ, Jr., has been appointed vice-president of the company and will be in charge of sales.

A permit has been granted for the construction of the Jefferson Southwestern R. R. to run from the three-railroad town of Marion in Jefferson County, 15 miles southwesterly through coal lands about to be opened by the **Nason Coal Co.**, of Chicago, to a connection with the Chicago, Burlington & Quincy, three miles from the location of a proposed huge mine. Construction of the road will begin soon and the sinking of the first of several mines on the property will start as soon as a new wage agreement is negotiated with miners.

The McDonough County Coal Co., of McComb, has been reorganized and the work of the company will be enlarged. With the enlargement will come the purchase of additional machinery, including a compressed air plant.

INDIANA

A merger of three of the largest coal companies in Indiana, including the **American Coal Mining Co.**, Brazil, **Indian Creek Coal & Mining Co.**, of Indianapolis, and the **Oliphant Coal Co.**, Vincennes, has been announced by H. A. Glover, Indianapolis sales representative of the new organization, which will be known as the **Knox Consolidated Coal Co.** The new corporation will issue common stock to the amount of $5,000,000 and the same amount of bonds. Two of the mines formerly were owned by the American company and one each of the remaining two were owned by the Indian Creek company and the Oliphant interests. The purpose of the merger was merely a combination of interests to improve business for all and to lessen the amount of competition in territories in which the coal mined by the three companies is sold. The Knox Consolidated Coal Co., with its present mines, will have a daily capacity of 16,000 tons and will be the largest single producer in Indiana. The company will be headed by E. D. Logsdon, Indianapolis, president of the Indian Creek Company at the time of the merger. Mining operations will be carried on under the direction of Simon Zeller, of the American company. W. M. Zeller, Jr., of the same company, will be treasurer. The general sales department will be under the direction of Mr. Glover, formerly of the Oliphant company. The board of directors will be composed of Mr. Logsdon, W. J. Snyder, Brazil, F. L. Oliphant, Vincennes; H. R. McClellan, Bicknell, Simon Zeller, Brazil.

The Tecumseh Coal & Mining Co., at Bicknell, has merged with the **Pike County Coal Co.** and the **Simplex Coal Co.** The new organization will be known as the **Howe-Coulter Co.**, and with it has been amalgamated the former sales organization known as the **Martin-Howe Co.** The Tecumseh company owns two large mines, one mile east of Bicknell. The president is W. H. Howe. John Coulter is secretary-treasurer and Robert McClevy is general manager. The company has a large acreage of coal land in Knox County yet to mine and also has 5,000 acres near Oatsville.

The Indiana & Ohio Coal Co. has been incorporated with capital of $100,000 to engage in the mining of coal. The incorporators are John Williams, Chares W. Wenner, Thomas G. Williams and John A. Young.

MISSOURI

A trust deed to secure an issue of $7,000,000 in first mortgage bonds has been filed by the **Central Coal & Coke Co.**, of Kansas City, in favor of the First Trust & Savings Bank, of Chicago, and is the largest instrument of the kind ever filed in Ray County. The law requires that the deed be filed in every county in which the corporation owns property and the company has a mine at Camden.

A charter has been granted the **Kirksville Coal Co.** to operate coal mines in the vicinity of Kirksville. The company has a capitalization of $150,000.

Kansas City interests are engaged in the organization of a company to operate coal mines in the vicinity of Wainwright in Callaway County. It is understood that **W. M. Summers**, of Kansas City, owns 3,000 acres there, and that in addition to the mining of coal the mining of clay will be carried on. It will be a steam shovel operation and it is anticipated that a brick plant will be built near the premises in the near future.

NEW YORK

L. P. Zimmermann, president of the Maxim Coal & Coke Corporation, Buffalo, since its organization, has sold his interest and resigned. The company is continued with former vice-president **D. T. McCarthy** elected president and treasurer and his son, **F. A. McCarthy**, vice-president and secretary.

Attorney General Charles D. Newton has taken steps to test the constitutionality of the **Pennsylvania anthracite tax** law and has appealed to the Attorney Generals of New Jersey, Massachusetts, Connecticut, Maine, New Hampshire, Vermont and Delaware to join him in the movement.

F. J. Kerner Coal Co. of No. 1 Broadway, New York City, has opened branch offices in Somerset, Pa., and Morgantown, W. Va.

OHIO

It is reported that the old coal carrying railroad between Palos and Marietta, part of which has been abandoned, will be electrified shortly and used to serve a number of mines on its line. The road was formerly the Marietta, Columbus & Cleveland.

C. E. Tuttle of the Puritan-Tuttle Coal Co., was in Cincinnati recently for a few days. He now makes his headquarters in New York.

The Murphy Coal Co., Columbus, recently chartered with a capital of $75,000, has been organized by the election of J. L. Murphy of Logan, president and H. H. Long, secretary and treasurer. The concern is allied with the **New York Coal Co.**, and has taken over an acreage in Boone County, W. Va., on the C. & O. The work of developing the property will be started at once and it is planned to be producing coal in several months.

Papers have been filed with the secretary of state chartering the **Wyoming Pocahontas Coal Co.**, with an authorized capital of $2,000,000 to mine and sell coal. Among the incorporators are H. L. Barkdull and P. J. Bickel. The operations will be mostly in the Pocahontas field.

Slidell and Ducker, attorneys, have asked for the appointment of a receiver for the **Big Mandy Coal Co.** in behalf of **Walter Bledsoe & Co.**, the **Mowbray-Robinson Co.**, and **J. I. Hunt,** an operator, of Chavies, Ky., in the United States District Court at Cincinnati . The moving spirit of the Big Mandy is Rush Meadows, who was connected with the failure of the Mohio Coal Co. last year. It is charged that coal in the retail yards of the Big Mandy company at Norwood and Winton Place has been turned over to Okey Meadows, his father, and who operates the Okey Meadows Coal Co. Companies opening offices in Cincinnati recently were the **Kelly's Creek Colliers Co.** and the **Cleveland Cliffs Iron Co.**, in the Dixie Terminal Bldg., and the **Keen Coal Co.**, at 43 Ingalls Bldg.

A schedule of assets for the **Tri-State Tile & Coal Co.** was filed in the United States District Court at Cincinnati which shows that this Ironton corporation has liabilities of $37,806 and assets of $41,967.

Alex Bonnyman, president of the Blue Diamond Coal Co., and the Blue Diamond Coal Sales Co., visited the Cincinnati office of the latter corporation for a conference with heads of departments while on his way to New York, where he sailed for a visit to Scotland.

Visitors to the Cincinnati market from the fields recently were: **S. A. Lewis,** of the Lewis Coal & Coke Co., Cabin Creek, W. Va.; **G. W. Hatfield,** of the Victor Coal Co., of Williamson, W. Va.; **A. R. Yarborough,** traffic manager of the Kanawha Operators' Association, and **C. S. Higgins,** of the New River association.

James Rice, president of the Rice Coal Co., of Dayton, and head of a Kentucky producing company, has recovered from a long attack of typhoid fever and has gone to Michigan to spend a month recuperating.

PENNSYLVANIA

The Frostburg Coal Co., of Punxsutawney, Jefferson County, was recently incorporated. The company has a capital of $50,000 and its purpose is the mining, buying, selling and dealing in bituminous coal. James H. Ritter, Punxsutawney, is treasurer, and one of the three incorporators, the others being William H. Ritter and Dr. Frank A. Lorenzo, Punxsutawney.

The Light Railway Equipment Co., with general offices in Philadelphia, has reorganized and rebuilt with new machinery, since the recent fire at the works near Philadephia, and is now operating to nearly full capacity.

Judgment of $12,000 awarded the Graff Furnace Co. by a Federal jury recently in its suit against the **Scranton Coal Co.** for failure to allow a sufficient amount of pillar coal under adjoining property is sustained by Judge C. B. Witmer in an opinion in which court refuses the request of the defendant for a new trial, but notes an exception for the defendant. Court did not enter into a discussion of the merits of the case. An appeal to the circuit court of appeals will be taken.

The Atlas Fuel Corporation of New York City, has removed its general offices to the Farmers Bank Bldg., Pittsburgh. Jay W. Johns, president, is in charge.

The Purity Coal Co., one of the Cosgrove group, operators of a 250-acre strip mine near Boswell, Somerset County, recently increased its capacity by the installation of a new Marion steam shovel.

VIRGINIA

Coal shippers are again in controversy with railroads serving Hampton Roads in an effort to get a reduction in trimming charges. Committees of coalmen, who importuned the carriers for a conference on the proposed reduction, have had their request granted but no date for the confer-

ence has ben set. Lemuel Barrows, president of Castner, Curran & Bullitt, of New York, was here in an informal conference between coal shippers and railroads. W. C. Higgins, representing the New River Coal Operators' Association, was also here. R. C. Moore, of the Southern Transportation Co., Philadelphia, served on the committee. A committee from the **Hampton Roads Maritime Exchange,** which has this matter in charge and took part in the preliminary conference, is composed of the following: W. W. Houston, Pan Handle Coal Co.; A. G. Bailey, Castner, Curran & Bullitt; E. O. Parkinson, Pocahontas Fuel Co.; and R. T. Pullen, C. H. Sprague & Sons, Newport News.

WEST VIRGINIA

The Buffalo Creek & Gauley R.R. Co. has awarded a contract covering the purchase of 300 steel hopper coal cars of 55 tons capacity, for prompt delivery. The company, which is owned by the **Elk River Coal & Lumber Co.,** runs from Dundon, its connection with the B. & O., to Widen, where the mine of the Elk River company is located.

In connection with three new indictments made by the grand jury investigating the dynamiting and shooting disorders of two years ago at Willis Branch, Lawrence Dwyer, international board member for District 29, who was recently in the East for the purpose of securing relief for miners, and David Robb, another official of the United Mine Workers, have been indicted for counseling, hiring and commanding parties to steal and conceal the machine gun taken from the Pax depot in August 1920, and also for counseling and aiding in disorders that were so common during the period Willis Branch was under siege. Indictments were returned against the officials upon startling testimony given by Walter C. Romine, Bryant Kidd and Grover Moore, all of who are under indictment. A complete confession was made of the parties implicated.

That he has just written policies approximating $2,000,000 at Omar, Logan County, insuring the lives of 2,000 employees of the **Main Island Creek Coal Co.,** was the surprising news given out by Roger Martin, Dublin, insurance man. Mr. Martin paid quite a tribute to A. J. Dalton, president of the coal company, who he said, presented a $1,000 policy to each of his employees.

The Bachmine mine in the New River field abandoned not long ago by its new owners is to be once again under the control of the **Maryland-New River Coal Co.,** the former owners of this property. With a view to resuming operations in the near future repairs are being made to the plant, and the post office at Bachman is to be re-established.

The magnitude upon which the **Rock Lick Smokeless Coal Co.** plans to operate in the New River field is indicated by the issue of $600,000 in bonds which have been taken over by the National Valley Bank of Staunton, Va., the bonds being secured by a deed of trust. This company secured not long ago about 2,000 acres of coal land from the Thurnond Land Co., the consideration as indicated by revenue stamps being approximately $120,000.

Hearings before the Public Service Commission of West Virginia were opened at White Sulphur Springs recently, in connection with the effort of power consumers in the Winding Gulf and Tug River districts to secure a reduction in rates from the Appalachian Power Co. Fifty coal companies in the two districts joined hands in presenting their case. Harry E. Harmon, president, and J. T. Wilson, secretary and treasurer, and Henry A. Warden represented the Tug River association, and J. C. Sullivan, president, and George Wolfe, secretary, represented the Winding Gulf district. Much testimony was offered to show that a reduction should be made, stress being laid by the coal operators on the fact that labor and fuel costs had been materially reduced since July, 1920, when the power company was permitted to increase its rates about 30 per cent.

I. J. Rhodes and L. A. Osborn, of Welch, and H. N. Eavenson, of Pittsburgh, have completed the sale of 6,000 acres of coal land lying on the waters of Long Pole and Fore Pole Creeks, McDowell County, 4,000 acres of which was owned by them and 2,000 by the Mingo Land Co., to the **Hardy Coal Co.** The Hardy company, with a capitalization of $2,500,000, will immediately install on Fore Pole Creek one of the most modern and best equipped plants in McDowell County. Paul Hardy, of Huntington, is president and general manager; Philip Coyle, of Boston, vice-president, and S. S. Stevens, of Boston, secretary and treasurer. A branch line of three miles will be built up Fore Pole Creek, contract to be let as soon as surveys are completed.

Preliminary to operating in the vicinity of Williamson, the **Compton Waugh Coal Co.** has been organized with a capitalization of $25,000. Active in organizing this company were C. S. Waugh, M. E. Waugh, of Williamson; L. T. Compton, R. D. Easterling and A. Compton, of Matewan.

With a view of operating in Harrison County, the **Moke Co-operative Coal Co.** has been formed, with a capital stock of $300,000, Clarksburg to be the headquarters of this company. Principal stockholders of the new concern are: W. L. Moke, Frank O'Day of Clarksburg, W. Va., W. D. Walker, of Kitzmiller, Md., George Warwick, Bloomington, Md., W. W. Leonard, Worthington.

WISCONSIN

Fire has completely destroyed the high belt conveyer system at the plant of the **Milwaukee Coke & Gas Co.,** causing a loss of approximately $100,000. The loss is covered by insurance. Coal will be transferred from vessels to the pulverizer by an improvised method until the conveyor has been rebuilt, so there will be no interruption in the daily output of 12,000,000 cubic feet of gas and 1,700 tons of coke.

WASHINGTON, D. C.

A new policy governing the procurement of mining engineers for the Government service has been announced by the **U. S. Civil Service Commission.** In the future in preparing eligible lists of mining engineers, applications for examination will be received during such period as may be necessary to build up eligible lists. Heretofore it has been the custom to announce an examination on a certain date. It has been found practically impossible to give general circulation to the announcement of examinations. It is believed, once it is understood that examinations can be taken at any time, more representative eligible lists can be secured. Just at this time there is a shortage of mining engineers. There are no fresh eligible lists from which these engineers may be drawn. While the need just at this time is largely for specialists in petroleum and coal, there are vacancies in other branches of mining engineering to fill. The salaries for mining engineers range from $3,600 to as much as $5,000. Salaries for associate mining engineers range from $3,000 to $3,600, while assistant mining engineers receive $2,160 to $3,000. Junior mining engineers receive from $1,620 to $2,160.

Traffic News

In the complaint of **Holmes & Hallowell Co.,** the commission on reargument, has modified the rates previously prescribed on bituminous and anthracite from the Head of the Lakes to points in Minnesota, and the Dakotas. The rates on bituminous begin at 85c. per ton on hauls of 30 miles and under up to $4.68 per ton on distances from 625 to 650 miles. On anthracite the rates range 85c.@$4.86 for the distances named.

Argument as to divisions between carriers of rates on bituminous coal to destinations in Michigan, Ohio, Indiana, Illinois and Wisconsin has been assigned for Washington, Sept. 25.

In a brief filed with the I. C. C. **John Morrell & Co.** claims that the rates on fine coal from the various Illinois districts and from related fields in western Indiana and Kentucky to Sioux Falls, S. D., have been unreasonable since Feb. 28, 1920, because they exceed the rates from the same points to Sioux City.

In dismissing the complaint of the **Corona Coal Co.,** against the Mississippi-Warrior Barge service, the I. C. C., in its opinion, finds that it does not have jurisdiction over the local rates of the barge line applying to port-to-port traffic; that the charges of the barge line in connection with the handling of coal at Violet, near New Orleans, are not prejudicial and that the barge line is justified in maintaining lower rail-than-water rates than are maintained on the all-rail route.

The I. C. C. has suspended until Sept. 12 the rates on coal from Bessemer & Lake Erie R. R. stations to stations on the B. R. & P. Ry.

The Illinois Coal Traffic Bureau has been authorized to intervene in the complaint of the **Indiana State Chamber of Commerce** involving rates on bituminous coal from Ohio No. 8 and Inner Crescent groups to Terre Haute and other Indiana points.

In the complaint of the **Northwestern Traffic & Service Bureau** an examiner recommends that rates on soft coal from Manitowoc, Wis., and other west-bank Lake Michigan ports on traffic from beyond to Minneapolis and St. Paul be declared reasonable.

An examiner recommends in the complaint of the **Republic Iron & Steel Co.** that the rate on bituminous coal from Russellton, Pa., to Youngstown, Ohio, is not unreasonable.

The Santa Fe has filed a brief with the I. C. C. in the complaint of the **Northern States Power Co.,** contending that no reason exists for requiring on fine coal lower rates than on other grades of bituminous to Sioux Falls, S. D., from mines in Illinois, Indiana and Kentucky.

Coming Meetings

Coal Mining Institute of America will meet Dec. 13, 14 and 15 at Pittsburgh, Pa. Secretary, H. D. Mason, Jr., 911 Chamber of Commerce Bldg., Pittsburgh, Pa.

American Chemical Society's annual fall meeting will be held Sept. 4-9 at Pittsburgh, Pa.; divisional meetings will be held at Carnegie Institute of Technology and general meetings at Carnegie Music Hall.

American Mining Congress. Twenty-fifth annual convention and exposition of mines and mine equipment will be held at Public Hall, Cleveland, Ohio, Oct. 9-14. Executive offices, the Hollenden Hotel; E. C. Porter, convention manager.

The Rocky Mountain Coal Mining Institute will hold its next meeting at Glenwood Springs, Col., Sept. 6-8. Secretary, F. W. Whiteside, Denver, Col.

New York State Coal Merchants' Association will hold its annual meeting at Richfield Springs, N. Y., Sept. 7-9. Executive secretary, G. W. F. Woodside, Arkay Bldg., Albany, N. Y.

National Safety Council. Eleventh annual Safety Congress at Detroit, Mich., Aug. 28 to Sept. 1. Executive secretary, W. H. Cameron, North Michigan Ave., Chicago, Ill.

Coal and Industrial Exposition under the auspices of the Huntington Chamber of Commerce will be held Sept. 18-23 in the Chamber of Commerce Bldg., Huntington, W. Va. **The West Virginia-Kentucky Association of Mine, Mechanical and Electrical Engineers** will again hold its annual meeting in the same building during the exposition.

National Exposition of Chemical Industries will hold its eighth national exposition at the Grand Central Palace, New York City, Sept. 11-16. Manager, Charles F. Roth, Grand Central Palace, New York City.

American Institute of Mining and Metallurgical Engineers will hold its fall meeting during the week of Sept. 25 at San Francisco, Cal. It is proposed to arrange for a party to leave New York on Sept. 10, stopping at different cities en route. Secretary, F. F. Sharpless, Engineering Societies Building, New York City.

Obituary

O. R. Scott, general manager of the Patoka Coal Co., died at his home in Indianapolis recently after an illness of three months. Mr. Scott was born in Terre Haute in 1877 and began his business career at an early age as delivery boy for a Terre Haute grocery. Later he was bookkeeper for a coal company there. He went to Indianapolis in 1913. From that time, his rise in the coal trade was steady.